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ORIGINAL COMMUNICATIONS.

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ON THE RELATION OF THE FACULTY OF HEARING TO THE FACULTY OF SPEECH.*

BY G. HUDSON-MAKUEN, M. D., PHILADELPHIA.

There are many degrees and kinds of hearing. No two people hear alike any more than they see alike, look alike or think alike. Hearing is an acquired faculty, and it grows by what it feeds on. The child at birth does not hear because its auditory nerves have not yet become medullated and its auditory centers have not yet become developed and differentiated. There was a time in the lives of us all when we were absolutely deaf as well as dumb, and our hearing, like our speech, has been the result of development. The hearing power of man varies in degree, within certain well defined limits, and just as there are sounds within these limits that some of us cannot hear, so there are sounds without these limits, perfectly audible to some of the lower animals, which no human ear has ever heard. Man's hearing seems to be adjusted and attuned particularly to meet the requirements of the human voice, and the range of the one corresponds very closely to the range of the other.

The faculty of hearing is a forerunner of the faculty of speech. Its most important function in man is to aid in the development of speech. Without hearing normal speech development is impossible. Faulty speech is often the first indication of faulty hearing, and the diagnosis of deafness is often reached and confirmed by a child's persistent dumbness.

It is a well known fact that the uneducated deaf child is always dumb, and will remain so until taught to substitute other faculties

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for the faculty of hearing as an aid to the understandng and development of speech, but it is not so generally known that a child with a considerable amount of hearing may also remain dumb unless some special speech training be given to it during the developmental period. The physiologic explanation of this fact seems to be that the auditory speech-center is merely a highly specialized portion of the cerebral cortex, and its full development is dependent upon a previous development, not only of the general auditory area, but also of the other related areas of the cerebral cortex. The exact amount of deafness, therefore, that will necessarily result in dumbness in a given case can only be determined after a careful study of the various faculties of the brain employed in the development of speech. A child, for instance, in whom the faculty of attention or of volition is weak may fail to acquire normal speech, although having a fair degree of hearing power. Generally speaking, however, a child will develop the kind of speech that he hears, and, if his hearing is defective, his perception and conception of speech-sounds will be defective, and his word-images stored up in the auditory speech-center will be correspondingly defective.

The etiology, therefore, in a certain number of cases having defective speech may be traced to faulty hearing and to improperly formed auditory word-images. The child who retains so-called baby speech through adolescence, and even into adult life, retains also baby word-images in his auditory speech-center, and these undeveloped images or pictures appear to him to be exact representations of the words he hears in everyday life. Secondarily, also, the sensory impressions of the movements of the vocal and articulatory muscles are faulty and undeveloped, and the correction of the baby talk consists, first, in developing further the auditory word-pictures and, second, in correcting and developing the kinesthetic impressions of the peripheral musculature of speech.

The development of the auditory speech-center is contingent upon the development of the general auditory area in the cortex. In other words, if a child does not hear sounds at all, he will not hear speech and he will not develop the faculty of speech, but it is a fact well recognized by aurists generally, and vouched for by numerous observers, that the hearing power varies greatly in different individuals and that it is not uniformly acute throughout its entire range. A child, therefore, may have fairly satisfactory hearing for ordinary purposes and yet fail to hear those parts of word-sounds

which are essential to the conception or understanding of speech and the proper cortical registration of word-images.

Again, as I have said, the development of the auditory speech-centers is contingent upon the development of related areas in the brain. The feebleminded child, for instance, may not be able to interpret the sounds he hears. He may not be able mentally to associate the word with the thing for which it stands, and thus he can develop no satisfactory and useful word-images. Such a person may truly be said to be mentally deaf, at least so far as speech is concerned.

Some of the lower animals also illustrate this point. The cat, for example, has extraordinary acuteness of hearing, but its powers of speech (fortunately) are comparatively limited. The cat's general auditory center is highly developed, but his auditory speech-center is quite undeveloped, because he lacks the general intelligence that comes from the development of related areas of the brain.

For purposes of speech something more than acuteness of hearing is necessary. The hearing must be uniformly acute for all speech sounds. There must be no gaps, such as we often find, rendering certain sounds of speech inaudible, and, above all, there must be a uniform development of those related areas of the brain whose function it is to interpret the sounds which are heard. The interpretation of speech-sounds varies in different children and it may be greatly improved by training. This fact explains why children who appear to be deaf and dumb may eventually be taught to hear and speak. Four years ago I had the pleasure of exhibiting before this Section a supposedly deaf child who had been taught to hear and speak, and I desire to report that she is now attending school for normal-hearing children.

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FUNCTIONAL PARALYSIS OF THE ACOUSTIC NERVE.*

BY F. GURNEY STUBBS, A. M., M. D., CHICAGO.

While we have comparatively little difficulty in separating diseases of the sound-conducting from the sound-perceiving apparatus, we are confronted with much uncertainty in classifying the diseases of the sound-perceiving apparatus. In line with other nerves of the body, special and otherwise, there is both an organic and functional affection possible of the accoustic nerve. Of the latter form of paralysis there will always remain a few manifestations, although as our pathological knowledge increases we have found a definite organic change in many conditions that were at one time styled functional.

In keeping with the classification of functional nerve paralysis there appear to be three forms of acoustic nerve paralysis: (1) angioneurotic; (2) rheumatic and (3) hysterical.

The *angioneurotic* form of functional acoustic paralysis is extremely rare and is probably closely associated with the sympathetic nervous system. It manifests itself in one or more attacks, each one lasting only a few minutes. They begin suddenly, with pallor of the face, ringing of the ears, dizziness, nausea, vomiting and hardness of hearing, last a few minutes and disappear with return of the normal color to the face. Urbantschitch has observed cases of tinnitus and hardness of hearing with accompanying severe pulsation of the carotid and marked reddening of same side of face, neck and auricle, and refers them to a vaso-motor disturbance of the sympathetic, a spasm of the vessels in the region of the acoustic center, similar to the hyperesthesia or anesthesia which frequently is present in migraine or the deafness which is seen following fright.

The galvanic current applied to the sympathetic of the neck is the only indicated treatment and in the cases reported has been efficient.

The *rheumatic* form arises from cold, heat, or in the course of other rheumatic manifestations. The paralysis may be of the acoustic nerve alone, or at the same time it may affect other nerves in close relationship with it, as the facial and trigeminus. When the acoustic alone is affected, it is more difficult to diagnose. Its manifestations will vary, depending on whether the cochlear portion of the nerve alone is involved or the vestibular also. In the former case

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the disturbance of hearing comes on in a few hours to days, and may be moderate or extreme in degree. There is usually a marked tinnitus present. The tuning forks give the usual reactions for primary nerve deafness—lateralization from vertex towards the normal ear, positive Rinne, lost or shortened perception through the cranial bones and perception for the deep tones through air conduction. If the vestibular portion is also involved, we have severe dizziness, disturbance of equilibrium, as an inability to stand with closed eyes or to walk straight, with nausea and even vomiting.

The diagnosis must be made from the etiological factors, such as exposure to cold or draught, presence of general or local rheumatism or gout, the course of the paralysis, and the complication with rheumatic paralysis of other cranial nerves, if present.

The course of the disease shows a disappearance of the vestibular symptoms first, if present, while the restoration to normal hearing is slower. In a certain percentage of cases there will remain more or less permanent defect of hearing.

While nothing is known, as yet, as to the pathology, still it is believed there may be a neuritis present. Ogston has compared these attacks to those of glaucoma met with in arthritic patients.

Treatment seems to have no effect on the course of the manifestations, yet galvanization is to be employed in addition to a general rheumatic medication.

The *hysterical* form of paralysis of the acoustic nerve appears as an acute hypesthesia or anesthesia. It may share in an hysterical unilateral hypesthesia or anesthesia of the whole body, or as a neurosis localized to the organ of hearing. This last form is very rare, especially when it is bilateral.

It is very frequently observed that hysterical patients complain of peculiar sensations in the ear, such as a feeling of tickling, creeping or flowing in the deeper portions of the meatus, painful constriction and pressure in the ear, an increased sensibility to noises, without any disturbance of hearing. Hysterical otalgia, especially in the presence of actual auditory disturbances, is quite common. But all these manifestations are separate and apart from hysterical hypesthesia or anesthesia. There should not even be present tinnitus or attacks of dizziness. In fact Hammerschlag regards them as a sure indication of organic affection, even in an hysterical individual. After examining a large number of cases of hysteria, he found that a disturbance of hearing without any palpable change of the hearing apparatus constitutes a very constant symptom, and that in spite of

variability of the manifestations there is a certain sharply defined symptom picture; also that hysterical anesthesia is much more rare than hypesthesia. Further, he found, as Frankl von Hochwart had already pointed out, that in hysterical hemianesthesia the ear (when at all) is affected on the disturbed side, but also in slighter degree on the opposite side. This corresponds to the limitation of the field of vision in analogous cases.

The hemianesthesia manifests itself by tactile hypesthesia, hyposmia, limitation of the field of vision, and a diminished sensibility to thermic and painful irritations on the affected side.

The onset of the deafness, unilateral, seldom bilateral, may be sudden or gradual. The return of normal hearing may also be sudden or gradual, though the deafness may persist for many months, constant, or with variations in degree.

The diagnosis rests upon the presence of other hysterical manifestations, and the absolute incongruity of the various hearing tests. On the one hand, the tuning forks give a reaction for primary nerve deafness; i. e., the bone conduction on the affected side is markedly reduced or lost. Webber goes to the unaffected ear, and Rinne is positive if the fork is heard at all by air. On the other hand—and this is the characteristic sign of hysterical hypesthesia—the voice and watch are heard disproportionately better than the fork, and, in like manner, better by air than bone. For example, by air conduction the fork may be heard one-eighth to one-fourth while the whispered voice may be heard one-third to one-half of normal. Where the fork can not be heard by bone at all, the watch may be heard by air conduction.

The lowering of the bone conduction would lead one to expect a greater shortening of the air conduction than one actually finds. Further, the inconsistency between the perception of the tuning fork tones by air and for speech is striking. The reduction of tuning fork tones by air bears no relation to the slightly reduced speech perception. Hammerschlag has attempted to explain the fact that the air conduction is shortened for tuning fork tones over speech, and calls it a "fatigue symptom," stating that it is due to an exaggerated fatigue of the acoustic nerve for tone-irritation which is continuous and gradually diminishing in its intensity, such as tuning fork tones. The symptom is this: a fork of medium pitch is strongly struck and held before the ear; when no longer heard, it is withdrawn for two or three seconds and returned to be again perceived. This may perhaps be repeated once or twice. Eitalberg claims that this symptom is diag-

nostic of organic acoustic nerve disease. I, myself, have observed it in apparently normal cases as well as in diseases of the sound-conducting apparatus and am inclined to regard it as evidence of mental confusion and lack of concentration.

When there is a general paralysis of touch and sensation there is also anesthesia of the external ear, otherwise only a lowered sensitiveness. It is especially characteristic in either hypesthesia or anesthesia that there is an entire absence of symptoms of vestibular nerve portion. Only in hysterical patients with middle ear trouble, on one or both sides, may it be present.

It is extremely rare to elicit the phenomenon of transference, but is also a positive symptom.

In the treatment, the galvanic current, as in the other forms, is the most used. Hypnotism has given brilliant results in some cases, as might be expected in hysteria. Metallo-therapy and transference is only a form of suggestion and rarely is successful.

In case the deafness shares in the general manifestations, then, more than ever, must general as well as local therapeutic measures be carried out—general tonics and stimulating diet, massage, electricity in different forms, and finally suggestion and even hypnotism. At the same time the patient must have his daily life so arranged that either a change in habits or in environment will assist in what might be called auto-suggestion.

As to local treatment, Gradenigo has called attention to the fact that when the patient has some slight palpable ear trouble and it is treated, with good results, the hysterical deafness will immediately clear up; but if the result of treatment is not at once good, then it will react as a psychical trauma and produce an increase of the deafness.

He also holds that those cases are hysterical which yield to electrical treatment, and that this therapy is without results in actual, anatomical lesions of the auditory apparatus. The galvanic current is preferred, and tolerably strong. The cathode is applied to the tragus, the anode to either the neck or the hand of the same side as the affected ear, the current is raised to 8-10 milleamperes, interrupted frequently, and the treatment should last from five to ten minutes. Some authors recommend the static electricity, but apparently with no better results.

The binding on the ear of a gold piece or pouring mercury into the meatus is not to be commended. It could only be employed in a densely ignorant and superstitious patient.

The following cases are reported as showing some of the manifold symptoms of the hysterical form as well as apparently one of the rarer manifestations of the angioneurotic form.

Case I. Mrs. E. H., aged 37, widow. General health has always been fair, aside from attacks of headache during the last few years. Had an hysterectomy six years ago. Heart, lungs and kidneys normal.

March 6th, 1908, went to New York to nurse a sister who was seriously sick with erysipelas and was greatly shocked on seeing her appearance, so much so that for two weeks she complained of feeling dizzy and of a queer feeling in head and a sensation of pressure on vertex. March 23rd, while eating dinner, suddenly complained of a feeling of impending death; fullness in head, face became intensely red, marked tinnitus aurium and dizziness, a sensation of an explosion in the head, followed by a feeling of water trickling down the outside of head. There was also nausea and vomiting. With this was deafness so marked that patient could not hear what was said for four or five minutes. She remained on a couch for about four hours, and during this time the veins of scalp and forehead were engorged and blue, and there was a livid appearance to lips and finger tips. For four or five days there was noticed a black-and-blue appearance to the scalp, and there was present a hyperesthesia of same. No physician was called, but soon after she was told by a trained nurse that she had had an attack of apoplexy and that she might lose her hearing if she had another attack.

On May 5th, while wiping a hardwood floor, she experienced the same sensations in head as of something bursting, and lost consciousness. She was alone in the house at the time, but believes she was in this state for about three hours. On recovering consciousness she felt as though the left side of head was dead, and that there was a block set into the side of the head which prevented her hearing anything on that side. Could see, smell and taste normally. There was no blueness of lips or discoloration of scalp as in first attack. The deafness disappeared on the fourth day as though a wave passed over that side of the head and removed the obstruction to the ear. Since this second attack, she has had three more in two months' time, but purely hysterical and confined to aural symptoms. These are all similar, each one coming on suddenly as though a plug had been forced into the external canal. The deafness would last from thirty-six to forty-eight hours. The last one occurred while out driving, and it was after this one that I first saw the patient. It was the day following the onset.

There was hyperesthesia of the external canal of the left side; membrana tympani on both sides normal. Tubes freely open and no naso-pharyngitis present. Weber to right. Schwabach, R. normal. L. reduced. A. C. R., 40-40., L. 10-40. B. C. R., 20-40., L. 8-40. Whispered voice, R. 21 ft., L., 9 ft. Fatigue symptom present. There were no general hysterical manifestations present.

One week later, hearing was normal to voice and forks.

I believe that this case can be considered one of angioneurotic deafness as to the first two attacks, though not seen by either myself or any physician, and the latter ones purely hysterical, though the persisting deafness after the second is undoubtedly hysterical also.

Case II. Mary G., domestic, mulatto, aged 34, married, no children, no miscarriages, never been pregnant. About ten years ago she had an attack of la grippe, after which she became deaf in the left ear, a deafness which has persisted up to the present time. She never had any discharge from it, however, that she could remember.

For six or seven weeks preceding her appearance at the clinic she had been almost totally deaf. This deafness came on suddenly, unattended by discharge, after a spell of sickness during which she experienced considerable pain in the head. It followed soon after a dose of medicine prescribed for her by the attending physician. This medicine, she believes, caused her to suddenly become deaf. She also complains that the left ear has more roaring in it than it had before her present attack.

Examined with reference to her general condition, especially as regards her nervous system, the following statements were elicited as to previous history. She stated that she had always been somewhat delicate, tiring easily at work, and not very strong, but had never had any very long or exhausting illness, either acute or chronic. Some years ago, after an illness of some days (she thought it must have been the grippe), she thought the room seemed dark one afternoon. She went to the window and raised the curtain, only to discover the trouble was with her eyes. She states that she became entirely blind, recovering her sight only after some weeks and very gradually. The family physician of the family in whose service she was at the time, treated her throughout this illness and the ensuing blindness. She has had no trouble with her eyes since.

A member of her family stated in conversation that "she had had nervous spells" and convulsive attacks brought on by overwork and worry on more than one occasion. The patient herself denied ever having had any such attacks.

Objectively,—the patellar and other reflexes were normal. The throat was unusually excitable during the examination of the larynx and postnasal space, and there was a general hyperesthesia of the cutaneous surface over the thorax and abdomen, amounting to a complaint of pain on light pressure. There was tenderness on pressure over the lower cervical and dorsal portions of the spine. No hysterogenetic zones or anesthetic areas were found. The patient's subjective attitude was decidedly hypochondriacal.

There was limitation of the visual and color field. Vision in either eye was 20-20. The addition of a combination of low plus spheres and cylinders gave her 20-15. The ophthalmoscope revealed a perfectly normal fundus. Neither were there any signs of any previous diseases of the other coats of the eye or of the media.

Auditory findings.—External ear normal in form and in tactile sensibility. Membrana tympani, R. normal, L. somewhat retracted and opaque. Eustachian tubes open on both sides. Voice sounds not heard in either ear. Fork tones not heard by air or bone in right ear. Weber to left. Schwabach, L. 7-40. Rinne, L. negative. The Galton whistle not heard at all.

She was under observation for four months, with irregular attendance, the last month of which galvanism was administered. During this month she had been professing to hear some, claiming first that she could hear an alarm clock when the alarm was in action and the clock held close to her ear. Then she reported being able to hear the conductor register his fares in the street cars. She never acknowledged hearing any conversation, although apparently understanding or guessing at much that was said to her. She claimed during the last month of treatment to hear the C^2 fork by air in both ears but not by bone in the right.

The diagnosis of this case rests on:—First, the history of hysterical attacks and the former hysterical amblyopia, and the present general hyperesthesia of the trunk and the hysterical visual field.

Second, the previously existing disease of the left ear as an unconscious mental suggestion for this form of hysterical manifestation, while the depressed state, mental and bodily, with the bitter medicine furnished the immediate cause of the attack. (The physician's prescription was for the elixir of iron, quinine and strychnine, of which the patient took three doses).

Third, the absolute loss of tone-perception in the right ear and the lessened perception in the other, with an entire absence of vestibular irritation symptoms.

The hyperesthesia of the body is contrary to the usual rule and is similar to a case recently reported by Thanisch.

Case III. Emily C., age 37, married; two children. Family and previous history negative. Physique: tall, slender, fair complexion, and of neurotic habit. Four years ago began to worry a great deal from family disturbances. Three years ago, following a blow on right shoulder with a slow-healing wound, first noticed a moderate degree of deafness which apparently would vary from time to time between the two ears. This condition continued for nearly a year, when she moved to Chicago. She claims that at this time she could hear perfectly. Six months later her husband deserted her and soon after her deafness returned. Conversational sounds were heard only as a whisper. Was treated by her family physician with nasal sprays and aural irritation, and after a time hearing improved. Was seen by me for first time some months after this, when the following conditions were present:—Membrana tympani, both sides slightly opaque, no retraction. Tubes patulous, no nasal catarrh. Fork tests:—Weber to right, Schwabach, R. diminished 5 secs. L. diminished 8 secs. Rinne, positive both ears. Watch heard, R. 24 in., L. 18. Whispered voice, R. 15 ft., L. 12 ft. In comparison, the fork was heard only 18-40 in R. and 10-40 in L. Fatigue symptom present.

Following general tonic and local galvanic treatment, hearing returned within one month to normal in right and almost normal in left. During this time Schwabach would vary from negative to positive and Webber from right to left. At no time was there any tinnitus or dizziness.

Some months after this, in December, 1907, she was greatly shocked by the sudden appearance of her daughter, from whom she had not heard for some time and about whom she was greatly worried. That night she attended the theater and heard perfectly well. The next morning, on awakening, she found that she could hear absolutely nothing. Examination same day showed total absence of sound-perception to all forks and the Galton whistle by air, and to forks by bone conduction. There was no tinnitus or disturbance of equilibrium. Patient complained of a sharp pain in the ears from the Galton whistle. She refused to take electrical treatments, claiming that it made her feel queer. During the next four months she would occasionally hear the words "Mamma" and "Blanche" when loudly shouted in the ear by her son. She also noticed the sound of the elevated trains, but never heard the forks or whistle. In April, per-

ceived a C^2 fork by air and occasionally street sounds. At this time she fell from a street-car, striking her head, and again total deafness ensued. In July, resumed the galvanic current, and in two weeks she could hear a C^2 fork by bone in right ear, certain words shouted in the ear, and a steam whistle, though not the Galton whistle.

The eye examination shows the hysterical limitation of color and visual fields; there are no somatic manifestations, there is a slight general hyperesthesia and increase of the reflexes.

The interesting points in this case are: the previous condition of impairment of hearing with an intervening period of normal hearing, the shock followed by a total and absolute deafness within twelve hours, the incongruity of the sounds she heard later; the condition of hyperesthesia of the body and of the acoustic nerve to sound as expressed by pain, with the anesthesia of the nerve as expressed by absence of perception of sound, and its being a bilateral affection.

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A REPORT OF FIVE CASES OF THROMBOSIS OF THE LATERAL SINUS WITH RECOVERY, BEARING UPON THE DIAGNOSIS AND PROGNOSIS OF THIS AFFECTION.*

BY HARRY FRIEDENWALD, M. D., BALTIMORE.

To those of us who as students learnt about thrombosis of the lateral sinus as a hopelessly fatal complication of suppurative otitis media, and who have followed the developments in its recognition and treatment, each case presents an exceedingly interesting problem. In June, 1900, I was able to report my first[1] successful operation, the first, I believe, in this city. The favorable termination alone of this and of several recent cases, while very gratifying, would not, however, justify me reporting them to this body. For the number of cases which have already been reported is very large. In the first edition of Koerner's monograph, Die Otitischen Erkrankungen des Gehirns, (1894) twenty cases were noted; in the second (1896) seventy-six cases, and in the third (1902) three hundred and eight are used as the basis of a statistical study. And the increase has gone on at the same rate. In making the following report it is my purpose not so much to put the cases on record, as to draw attention to certain important points bearing on the diagnosis and prognosis of thrombosis of the lateral sinus.

In the published case referred to, the patient was a man, aged twenty-nine, who had otitis media following facial erysipelas. The drum had been punctured without relieving the pain. After suffering with the ear for about two weeks he entered the City Hospital on January 6th, 1900. His temperature fluctuated between 99.8° and 101.2° until the evening of January 9th, when it rose, within a few hours, to 105.2° without any chill. On the following morning it was 100.5°. His mastoid was freely opened and the tympanic membrane incised. On January 11th the temperature rose to 104° (pulse 105), with a subsequent drop to 101° (and pulse 105) on the 12th, but again reached 104° (pulse 100) in the evening, without a chill at any time. During the following days there were fluctuations between 99.5° and 103° until January

(1) Maryland Medical Journal, June, 1900.

*Candidate's thesis, presented at the meeting of the Southern Section of the American Laryngological, Rhinological and Otological Society, held at Baltimore, December 27-28, 1907.

17th, when 105.2° was again reached. The blood had been frequently examined and no leucocytosis found. This fact, together with the absence of chills and the great relief of pain after the operation, made the diagnosis of thrombosis very doubtful, but when the temperature again rose on the 17th to 105.2°, the diagnosis was made, and the operation for thrombosis without ligature of the jugular was performed. A broken-down, purulent thrombus was found shut in by a solid thrombus on both ends, the whole occupying about two and a half inches. It was thoroughly cleaned out. Cultures from the thrombus developed streptococci. In this case it will be seen that the mastoid operation was performed within twenty-four hours after the first very high temperature was noted, and the lateral sinus was opened eight days later. The patient made a perfect recovery. From this case I learnt that the severe chills upon which most writers had laid great stress may be entirely absent, and must not be regarded as a *sine qua non* for the diagnosis. The case also demonstrated that the absence of leucocytosis is likewise no reliable guide.

Case 2. Miss M. C., aged sixteen, a large, well-developed girl, came to my office on January 21, 1907, complaining of some aching in both ears, following grippe. The left drum was somewhat bulging and congested, the right slightly congested. A ten per cent solution of carbolic acid in glycerine was ordered to be dropped into the ears, and she returned on Jan. 23d, 25th and 30th, the pain having gradually ceased and the congestion rapidly diminishing. On February 2d I noted: "Left drum slightly congested, almost normal." She was apparently well until February 10th, when, after exposure in coasting in the country, the ear became very painful and she was sent into the City Hospital on February 12, where I saw her within a few hours. Her drumhead was greatly congested and bulging, she was suffering intensely, her temperature was 102° (pulse 112), and I incised the drumhead freely under ether anesthesia. The incision gave her great relief; she improved continuously, her temperature fell to between 101° and 99.5° on the following day; on the third day it rose to 101.6° (pulse 100), but fell to 98°; and on the fourth day it reached 99.8° and fell to 98°. At this time the patient was feeling very well; the ear was discharging moderately. On the fifth day it rapidly rose to 104° (pulse 120) at midday. I saw her soon afterwards. The patient was stupid, but it was not difficult to rouse her. She complained of much headache. A blood count at this time gave a leucocyte count of 9,400.

Between eight and nine, I saw the patient again. Her condition was unchanged; her temperature, which had fallen to 102.2°, was again high (103.8°, pulse 132). There had been no chills. There was some sensitiveness to pressure over the tip of the mastoid. A careful general examination had been made without showing any other cause for the high temperature. That night, I opened the mastoid process. Pus was found just under cortex in small amount; there was softened bone leading backwards toward the knee of the sinus, but no pus,—no extradural abscess. The tip of the mastoid was free from pus. The wound was thoroughly cleaned and sutured. (The pus contained staphylococci). While the patient was under the anesthetic, a lumbar puncture was made. The fluid was clear and cultures were negative.

On the following day, February 18th, the patient appeared brighter and complained of no pain. The temperature had fallen to 97.8° for a very short time after the operation, but had risen again to 105° (in the axilla) at four-thirty that afternoon, (pulse 132). It steadily fell to 99.6° at midnight, (pulse 96), then again rose and on the following afternoon (February 19th) at four, reached 104°, (pulse 132). This was followed by another steady decline to 99° at four A. M., (pulse 88), on February 20th. The temperature remained low until midday, when it was 100°, but then there was a rapid rise to 103.4° at two P. M., 105.2° at four P. M. and 105.4° (rectum) at six P. M., (pulse 124). During these days, her general condition remained unchanged. She did not complain of pain; repeated examinations of her lungs revealed no signs of pneumonia. There was no indication of trouble in the abdomen which was carefully examined. There were no signs of typhoid, nor any symptoms of meningitis. The fundi of both eyes were normal. Calomel and salts had been given with effect. In spite of the absence of pain, of chills, of sweats and of any marked sensitiveness along the course of the jugular, I determined, against the opinion of two able colleagues, one a skillful surgeon, the other a well-known otologist, to wait no longer, but to open the lateral sinus. The operation was performed that night (February 20, 10 P. M.). The internal jugular vein was tied at a point about half way between the base of the skull and the clavicle; it was found collapsed; the wound was closed. The wound over the mastoid was opened and the sinus was exposed; it showed no marked change on the exterior; towards both ends it was bluish, in the middle whitish and slightly roughened, but a large thrombus was found within embracing the entire sinus down to the bulb and extending about one inch behind the knee, so that

there was some bleeding at the lower end and a free gush of blood from the posterior. The thrombus was chiefly a solid white mass, but there was also some soft, broken-down pus. It was completely evacuated. The outer wall of the sinus was removed. Cultures and smears from the thrombus yielded staphylococci. The wound was packed.

During the next twenty-four hours (February 21st) the temperature did not go over 102° and the patient rested comfortably. But early on the morning of February 22nd, the patient complained of great pain in the right ankle and in the neck just below the wound. The temperature again rose, reaching 104.2° at ten A. M. and 104.8° at seven P. M., (pulse 124). The wound was dressed at midday; there was some swelling of the face and of the neck which was very sensitive to the touch. The ankle was very painful on pressure or when moved, but there was no redness nor swelling. The wound was dressed daily, the bulb of the jugular was washed out by means of a long, bent silver canula. But the temperature remained high, fluctuating between 102° and 104° for days. In the meantime, the right ankle became edematous and red and the swelling of the face disappeared, excepting in an area over the upper part of the jugular. On February 27th, fluctuation could be made out in the ankle. Leucocyte count 9,600.

February 28th. Deep punctures in the ankle gave no pus.

March 3d. A soft blowing systolic murmur was dicovered over the mitral area (which persisted and was present on May 1st, when patient was discharged).

March 4th. Under local anesthesia (ethyl chloride), an incision over the outer side of the ankle emptied two ounces of pus (smears and cultures from pus contained staphylococci).

March 6th. The scar of the jugular wound has opened and emptied of a small amount of pus, relieving the induration which has existed since the operation.[2] The condition of the ankle has gotten worse; there is great swelling and much redness. Dr. Albertus Cotton was called in and under ether anesthesia, opened the ankle joint by a number of incisions. The joint was drained anteriorly and posteriorly with rubber tube drains, the other incisions with gauze. (The drains were all removed on March 10th). The patient, much debilitated by the previous suffering and fever, was greatly shocked by this operation but responded to stimulants.

(2) Koerner recommends that the wound for the ligation of the jugular be left open at least above because of the tendency of the upper end of the jugular to suppurate. This case as well as the two following do not support this advice. See Monograph. 3rd ed., p. 131.

March 14th. Patient complained of pain in the right hip. No redness nor swelling. This gradually increased during the next two weeks. On April 3rd, there was considerable swelling over the hip and Dr. Cotton made a long incision under local anesthesia (cocaine) and evacuated about six ounces of pus. (Smears and cultures of the pus contained both staphylococci and streptococci.) A drain was kept in the wound for about ten days. Her temperature did not become normal and remain approximately normal until about the 22nd of March. By the end of April, her wounds had so far progressed that she was sent to her home on May 1st, where, since then, I am informed, she has completely recovered.

The case just described is one of great severity. The very high temperatures, the rapid prostration of the patient, the early occurrence of a metastatic abscess in the ankle and later in the hip make it evident that but for an early operation, the patient would not have recovered. The mastoid operation was performed twelve hours after the first high rise of temperature, the sinus was opened three days later, and yet the only sign upon which we could depend was the temperature. We must not allow absence of chills and sweats and pain to make the diagnosis doubtful, if the fluctuations of temperature and the height of the fever, which are characteristic, are present. Every other possible cause of the fever must be sought for as was done in this case, but delay is dangerous, and it is unnecessary and wrong to wait for more indications of the disease. In the next case, the operation was done still more promptly.

Case 3. W. T., a boy aged fourteen, was admitted into the Baltimore Eye, Ear and Throat Charity Hospital, September 6th, 1907, having been sent by Dr. Gambrill, of Alverton, Md. There had been no ear trouble until about ten days before admission, when he was kicked in the ear while swimming. There was some pain at the time which, however, ceased and the patient thought no more about it until a day or so later, when a profuse discharge set in from the right ear together with febrile symptoms. Dr. Gambrill was called in and ordered irrigations. The discharge, however, continued profuse in quantity and the boy's general condition became worse. There was high fever, general depression and vomiting.

On admission to the hospital, examination of the right ear showed profuse discharge, which, on being cleaned away, rapidly reformed. Tenderness over the mastoid was especially marked over the tip and in the neck below the tip. Temperature 101°. Irrigations were ordered at once, but the boy's temperature steadily rose during the afternoon and evening until at 7 P. M. it was 105°, pulse 130. It was

then decided to operate at once. Ether was administered. The usual curved skin and periosteal incision was made behind the right ear. On the first blow of the hammer over the antrum, pus oozed from the bone. The antrum was opened and found to be large in size and filled with pus and granulations. The tip cells were next opened. The mastoid was of the pneumatic type, being honey-combed with small cells each filled with pus. When all portions of the mastoid seemed cleared, some new cell would be discovered. The process of cleaning away the cells was continued until there remained but a shell of bone. The sinus was not exposed nor was the dura at any point. The wound was irrigated with normal salt solution and the skin was closed by a subcutaneous silver wire suture.

September 7th. Patient fairly comfortable. Profuse discharge from the ear which was mopped out. Complains of some pain in neck below tip and this region is slightly swollen.

September 8th. Fairly good day. Temperature 100°.

September 9th and 10th. Complains of pain in neck and temperature remains rather constant between 99° and 99.5°.

September 11th. Dressing. Wound found filled with pus. Suture removed and wound broken down and thoroughly irrigated. Temperature began to rise at ten A. M. to 102.2°; at noon 104.5°. During the next fourteen hours, it varied between 104.8°, (pulse 120), and 103°, (pulse 100), then fell to 101.4°, (pulse 86), at eight A. M. on September 12th.

September 12th. Second dressing. Wound seemed in good condition. Less discharge from ear which up to this time has been most profuse. Temperature continues to rise high. At five P. M., temperature 106°, remaining over 105.5° from four P. M. till seven, (pulse 110). At seven, he had a "chilly feeling." Patient complains of no pain. There is some swelling in the neck below tip of the mastoid which is tender. There has been no chill and no sweating. Thoracic and abdominal complications as well as erysipelas excluded. Bowels moved freely after calomel. Fundi of both eyes normal. Mental condition good, excluding meningeal complications. There being no possibility of retention of pus in the bone after so thorough an opening of the mastoid,—the diagnosis of thrombosis of the lateral sinus was made because of high fever alone. Under these conditions, it was decided to operate immediately and to ligate the internal jugular vein before opening the lateral sinus. The jugular was exposed at the point of election. The vein was rather small but not collapsed, though sometimes it would almost

collapse while under observation. A single ligature was used to tie off the vein and the wound was closed with sub-cutaneous silver wire suture.

The mastoid region was next exposed; some swelling being noticed below the tip of the mastoid, in the neck the original mastoid wound was enlarged downward in a search for pus. None was found. The inner plate of the mastoid was then cut away until the lateral sinus was exposed. The bone wound was enlarged until the bone had been removed back beyond knee about one-half an inch and downward until the entire tip had been taken away. The lateral sinus showed no pus on the outer surface, but it seemed as if the lower portion was whiter than the portion above and perhaps flatter. At no point was there direct extension of the bone disease to the sinus though about the knee the diseased portion approached very closely. A fine incision was made into the sinus when a little oozing occurred, but no free bleeding. The wound was then enlarged and the thrombus removed. About one and one-half inches of the sinus wall was opened and removed. A little bleeding occurred at the lower end, free bleeding at the upper. The sinus was then plugged above and below, and a sterile dressing applied, after the mastoid incision had been sutured in its lower portion. Patient returned to bed in a very good condition.

September 13th. Patient does not complain of pain. Highest temperature 104.6°, pulse 100.

September 15th. No pain or discomfort. Highest temperature 103.4°.

September 17th. First dressing. Stitch removed from the neck, —wound had healed by first intention. Mastoid wound clean. No bleeding from the sinus; wound repacked. Collodion dressing on the neck. Boy in excellent condition. Highest temperature 101.6°.

September 20th. Temperature rose to 102°.

September 21st. Second dressing. Wound looks well. General condition of the boy good. From this time on temperature normal.

October 3rd. Patient discharged to return for dressings. Wound granulating well. Sinus closed. Wound in neck perfectly healed. No swelling or pain anywhere. Patient last seen in the first week of November. The wound had then closed nicely by granulation and the boy was in excellent condition.

In this case it will be seen that conditions were similar to those in the preceding case. We had no sign as a guide except the fever. But here action was still more prompt. The temperature rose to 105° before the first operation, but after the mastoid had been open-

ed, it fell steadily for four days. On the afternoon of the fifth day, there was a sharp rise followed by a slow fall, and in spite of dressings of the wound, a still higher rise of temperature on the following afternoon. The sinus operation was then done within thirty-six hours after the rise of temperature. The subsequent course was most satisfactory and almost the same as though it had been only a simple but extensive mastoid operation. The patient was discharged from the hospital in three weeks and in four weeks more the wound had closed completely.

It is safe to infer that it is to the promptness of the operation that the very favorable outcome is due. This case, even more than the former, bears evidence that the prognosis is the more favorable, the earlier the condition is relieved. But cases of early operation are not the only ones which have a favorable termination, as is shown by the following.

Case 4. Miss M. S., aged twenty-five, was admitted to the City Hospital on September 22nd, 1907. The patient taken ill one week ago to-day (September 15th). The illness began with aching in her left ear which had been discharging for the last four or five years. The discharge has been purulent, containing blood at times and had a very bad odor. Last week she had pain in that ear, and throbbing pains in her head. She has not been able to hear with that ear since the first attack. The discharge has now diminished. Has been vomiting during the last week. Bowels very loose. Loss of appetite. Not able to sleep at night on account of the pain. Some pain across the bridge of the nose. Has had chills with marked sweats.

Physical examination:—Face has a very anxious expression; eyes very bright; has a sallow complexion; tongue furred and heavily coated. Extreme pain and tenderness to pressure over the region of the mastoid on left side. Temperature 104.2° this noon. Right ear normal.

Abdomen:—Very tender in the right iliac fossa, also over the region of her spleen and liver. Blood count, 10,400.

September 25th, 1907. Pain in head and at sterno-clavicular junction, also in knees. Herpes in both nostrils. Seems somewhat delirious at times. Widal negative. Blood examination for malaria, negative. White blood count 23,831.

I first saw the patient on September 26th. Her severe chills had been recurring frequently for twelve days; while at the hospital her temperature had frequently reached 103.5°, 104°, or 104.5° with drops to between 98° and 100°. Her sweats had been marked. There was no hard cord to be felt in the line of the jugular. The

diagnosis was clear. I advised that the operation be done forthwith. The jugular was ligated first. Then the usual mastoid operation was performed. The bone was found highly sclerosed. Toward the antrum, broken-down cholesteatomatous matter was found. As the bone wound was enlarged in the direction of the lateral sinus, a cavity was opened out of which a large amount of pus evidently under marked pressure was emptied and continued to escape during the further progress of the operation. The antrum was found carious, but in view of the patient's weak condition it was deemed wise not to subject the patient to the radical operation at this time. The opening in the posterior part of the wound from which the pus was escaping was enlarged—and proved to be the sigmoid sinus whose outer wall had been softened and broken down so that the pus was found coming directly out of the sinus. The sinus was exposed in both directions and firm clots found toward the bulb and at some distance behind the knee. There was free hemorrhage when these were removed. Smears made from the pus coming from the sinus showed the organism to be the streptococcus.

The wound was packed and drained frequently. There was uninterrupted recovery. No chills occurred after the operation and the temperature rarely rose above 100°. On the second day, it rose to 101.8°, on the third to 101°, and on the twelfth day there was a sharp rise to 103.6°. But this dropped after a dressing of the wound and from this time on the temperature was normal. The patient left the hospital on the twenty-third day, in excellent condition; the wound healed entirely in about two and a half months. The otorrhea still persists.

The blood count in this case was interesting. At the time of admission (September 22nd) there was a leucocytosis of 10,400.

On Sept. 25th 23,800
On Sept. 28th, day after the operation.....43,600
On Sept. 29th 21,400
On Sept. 30th, ...12,400
On October 1st 14,000
On October 2nd, ...13,700

The feature of special interest in this case lies in the explanation it offers of the favorable course and the absence of metastatic abscesses when chills and fever had existed for almost two weeks. The great central portion of the thrombus had become purulent but at both ends this purulent mass was closed by a firm clot, which kept the pus from entering the general circulation in spite of the

high pressure under which it was held. To the success of this effort of nature, we must attribute many recoveries after operations long delayed. Reflection upon these cases convinces me that they also in a measure explain the varying attitude of operators toward the subject of ligation of the jugular vein. When a thrombus is so firm that it can resist the high pressure just described, and thus prevent the formation of metastatic abscesses, even after many days, it is probably as unnecessary to tie the jugular as it is essential to tie it in cases like number two and three. In the former it is probably inadvisable to break down the firm clot.

The views just expressed find corroboration in a case of what may be termed spontaneous recovery from sinus thrombosis which came under my observation some years ago.

Case 5. In December, 1903, I was called to see a child two years of age, who had within a few months suffered from an attack of scarlet fever, followed by measles. Double purulent otitis media was the result. A swelling had appeared over the left mastoid which a physician had incised three weeks before I saw the patient. I found a marked hard swelling about an inch behind the incision over the mastoid. The ears were both discharging. On the following day, the mastoid operation was performed. No visible opening into the mastoid was found in the surface of the bone which contained pus and granulations. The mastoid process having been cleaned out, a second incision was made one inch posteriorly into the abscess and much pus evacuated. The bone was found denuded. The patient made a good recovery but both wounds continued to suppurate and excessive granulations formed. On January 26th, I dressed the wounds and found that a probe could be passed far into the posterior one, but it was not possible to determine its exact position.

On February 3rd, the patient having been admitted into the City Hospital, I found that the probe passed far into the skull cavity. An incision was made which joined the two previous incisions and the bone exposed. It was then found that a fistula extended from the posterior wound into the skull, the opening being situated in the masto-occipital suture. The opening was not more than five or six mm. in diameter and perfectly circular. It was enlarged and the bone removed forwards towards the ear, thus exposing the fistulous canal. I then found that the pus had not come from an extradural abscess, but that it was the lateral sinus itself which was continuous with the fistula. A grooved director was passed into the canal and it was slit open. In the sigmoid portion, the part was found where

the sinus had been exposed to the mastoid disease and where the infection had occurred. It was evident that a septic thrombus had formed but had been securely shut off from the circulation by firm clots and that the pus had evacuated itself through the emissary vein, thus producing the abscess. The patient recovered nicely from the operation and is still under occasional observation for chronic purulent otitis media.

The case just described furnished an extreme example of the limitation of the septic thrombus which is to be regarded as a conservative effort of nature and which to a lesser degree is not of infrequent occurrence.

The cases just reported appear to emphasize:

First:—That the favorable prognosis of cases of thrombosis of the lateral sinus depends upon the surgical removal of the infected thrombus at the earliest possible moment, before metastatic infection has occurred or upon the effective limitation of the infected mass by a solid non-infected thrombus at both ends, and

Secondly:—That the early diagnosis may and should be made in those cases in which chills, sweats and pain are absent on the characteristic sharp rises of temperature to 104° and higher and the irregular fever, when other conditions which may cause high temperature can be excluded.

No. 1029 Madison Avenue.

The Therapeutic Application of Negative Pressure in Nasal and Aural Infections, with a Consideration of the Opsonic Index.

E. R. LEWIS. *Medical Herald*, October, 1908.

The author analyzes the principles of induced hyperemia as applied to acute mastoiditis and acute suppurative otitis, and points out that mastoid operation is only necessary when natural drainage from the mastoid is impeded. With induced hyperemia by strong prolonged suction by way of the external auditory canal enormous amounts of blood and pus can be evacuated and the antibacterial weapons, opsonins and phagocytes, etc., are brought to bear against the infection.

He gives a case of his own, illustrating the above points, in which an undoubted mastoiditis was cured and far more hearing saved than after operation. EATON.

POST-GRADUATE INSTRUCTION IN OTO-LARYNGOLOGY.*

BY GEO. E. SHAMBAUGH, M. D., CHICAGO.

A frank discussion of the conditions which confront us to-day will help in an intelligent understanding of the problems for the future to solve in the task of preparing men for practice in the special fields. A recognition of our own shortcomings is often the best means of ascertaining where the future will inevitably improve upon present-day conditions.

Too much emphasis cannot be laid upon the fact that many of the great achievements of modern medicine are the direct result of the tendency towards specialization. A more or less general recognition of this fact has created in all parts of our country a demand for the trained specialist. This demand has its parallel in the great demand for the trained physician which existed a half-century ago as the result of the rapid development of our frontier. The latter resulted in the establishing of a larger number of proprietary medical schools, which for a time served a useful purpose, but which are now for the most part a serious obstacle in the way of the higher development of medical education.

The history of the preparation of the specialist is in a large measure parallel to that of the training of the general physician. To meet the increasing demand for trained specialists there sprang up, in all of our larger centers of population, the so-called post-graduate medical schools. These schools extended practically the only opportunity for training in the specialties, and the result has been that they were crowded with physicians from all parts of the country, seeking the necesary preparation to practice in special fields. These post-graduate medical schools have filled a useful place, but, like the proprietary medical schools, their period of usefulness has largely disappeared. Specialization of to-day has outgrown the post-graduate medical school fully as much as general medical education has outgrown the old-type proprietary medical school.

The time was in the earlier days of specialization, before much had been accomplished in the development of the special fields, when it was customary for the general practitioner without any special preparation to limit his work to this or that specialty, and from that time he was recognized as a specialist. It was under these conditions that the post-graduate school accomplished its best work.

*Read at the Thirteenth Annual Meeting of the American Academy of Ophthalmology and Oto-Laryngology at Cleveland, Ohio, August 27-29, 1908.

These men would get away from their work for a few weeks, and at the post-graduate school they would acquaint themselves with the use of the instruments necessary for the examination of their cases, and, returning to their practices, they gradually developed, if they were studious and persistent, as the specialty itself developed and expanded.

That conditions to-day have changed everyone recognizes. How great the change has been comparatively few seem to realize. There still exists in the minds of many only a half appreciation of what specialization really implies. It does not seem to be generally recognized that the development of the specialties has in recent years carried the work in these fields so far beyond the scope of the work done by the general practitioner, or the general surgeon, as to require at least several years of close, painstaking study in order to give one a preparation adequate to take up the real work of the specialist. It is still not uncommon to-day to see the general practitioner drop his general work, for which his medical course has prepared him, and limit his practice to this or that special field, with no further preparation than a few weeks' attendance in a post-graduate school, or a few months' trip abroad.

Another example of this lack of appreciation of what is actually being done in the special fields is the spectacle which we still sometimes see, of the general surgeon undertaking to operate on the mastoid for the relief of complications arising in the course of chronic suppurative otitis media, when he might just as logically assume to do the dental work for his patient. The one is as remote from his regular line of work as is the other, and in attempting to operate on the mastoid he is subjecting his patient to the unwarranted risks necessarily associated with surgical work about the ear when undertaken by anyone who has not given to the anatomy of this region the careful detail study which only the well trained specialist has done.

These evils are, in part at least, only to be expected as necessary to a new order of affairs, such as the rapid development of the specialties has brought about. Yet the blame for the present-day conditions, where we see so many men who have had no adequate training limiting their practice to special fields, is in a large measure with ourselves. We still lend encouragement to the idea that a practitioner can become a specialist over night by permitting our post-graduate schools to issue at the end of a few weeks' attendance a certificate which is intended, and is actually used, to lead the patient into believing that the physician has actually had the train-

ing necessary to prepare him to do the work of the specialist. As a matter of fact, he is often scarcely prepared to do the work which any well trained general practitioner can do, while all the conditions which call for expert special care are entirely beyond his scope.

Just as the multiplication of proprietary medical schools has led to the turning out of physicians far in excess of the actual demand, so in recent years the tendency to specialization has been greatly overdone. This is particularly true in the field of the eye, ear, nose and throat. There is scarcely to be found throughout the country a town where there are not one or more physicians limiting their practice to these special fields. An inquiry will frequently elicit the fact that it is often the unsuccessful practitioner who has thus sought to better his condition by limiting his work to a speciality; just the type of men who by nature are least fitted for the more difficult and more exacting work of the specialist. In the general enthusiasm for specialization such men are often carried along to a spurious financial success, although in many instances they are doing none of the real work of the specialist, in fact, are often doing no more for their patients than before they began limiting their practice.

The graduates from all of our better medical schools are to-day receiving enough training in each of the special fields so that they can themselves understand and care for all the simpler conditions which comprise the scope of work which the six weeks' specialists are doing; at the same time, they get to see enough of the real special work to appreciate that a general practitioner cannot be transformed into a specialist in six weeks or six months, but that at least two or three years' painstaking study is necessary to adequately prepare a physician for such work. Those who are in touch with the advancements that have been made in the special fields are aware that the technical skill required in the examination and the surgical treatment of the diseases of the eye or the ear are as far removed from the work of the general practitioner as is the work of the dentist, and yet a physician who wishes to practice dentistry is required by law to take special training covering three years.

It is, I believe, apparent that the time is ripe for a revolutionary change in our attitude towards the preparation of the specialist. It should be recognized that one of the most urgent problems in medical education to-day is the establishing of courses of instruction which will provide adequate preparation for the physician entering the practice of the special fields. It must also be apparent that such courses should be as much in the fundamental sciences as in the clinical study. Thorough training in the special anatomy, the

special physiology and the special pathology of the part must be insisted upon. All this work should be put on the basis of real graduate courses, that is, the work should be, as far as feasible, exhaustive. In anatomy, for example, not only all the known facts in the anatomy of the part should be brought out, but the work should lead up to a discussion of the unsolved problems in the anatomy of this region. The same should be done for the physiology, the pathology and embryology of the special field. It is only after these fundamental sciences have been mastered that one is properly prepared to take up intelligently the clinical study of the subject. The method still in vogue in our post-graduate schools, of attempting to teach the man preparing for a specialty the clinical aspect of the subject before he has been thoroughly grounded in the fundamental sciences of the subject, is as absurd as it would be to attempt to teach clinical medicine or clinical surgery without first requiring thorough training in general physiology and general anatomy. The opthalmologist who has mastered the fundamental sciences in his subject, stands out to-day distinct from most of the men practicing in this special field. In the future we may expect that it will be required of the ophthalmologist that he understand the fundamental sciences in his subject before he can practice ophthalmology, just as the dentist to-day is required to study the special pathology and the special embryology, etc., of the tooth before he can practice dentistry.

To acquire the knowledge of the special anatomy, the special physiology, pathology and embryology of an organ like the ear, or the eye, which a well-trained otologist or ophthalmologist should have, would require at least one whole year. Another whole year should be the minimum devoted to clinical study before one should be allowed to practice in these specialties.

We have at present no provision for work of this kind. The training offered in the post-graduate schools in no way covers the field. This work is seldom as thorough as the work in the special fields now being required in our leading undergraduate medical schools. The smattering of clinical instruction to which the post-graduate schools limit their work is of minor importance when compared with the practical benefit to be derived from adequate instruction in the fundamental sciences of the specialties.

In the higher development of our undergraduate medical schools an intimate connection with the universities has been found indispensable. In the same way the development of adequate courses for the preparation of the specialist will be possible only in our great university medical schools with their well equipped laboratories.

100 State Street.

A FURTHER STUDY OF LARYNGEAL NEOPLASMS IN AMERICA.*

BY J. LESLIE DAVIS, M. D., PHILADELPHIA.

The scientific mind of the human race, even for centuries following that period designated in history as the Dark Ages, suffered from chronic apathy from which recovery has been slow.

"As it was in the beginning, is now, and ever shall be," had verily been the common chant of the ages, till slowly, but surely, the world moved out of darkness into light, and within the limit of less than a century have medical men awakened to the realization that it is day-break everywhere! How long we are to linger in the dawn of the morning, or how near we may be moving toward the zenith of attainment, must remain for observers of the future to determine. Yet knowing this,—that each generation is "child and heir of all the past and parent of all the future,"—may we so use our heritage that a modest pride, at least in prophecy, may well be justified.

From a perusal of history I am led to believe that as a factor in the retardation of scientific advancement an undue regard for precedent has ever ranked higher than prejudice. New trails through the wilderness of ignorance and superstition, almost without exception, have been hewn single-handed—not so much because the people objected to the newer fields of thought, as that they were passively content to continue in the beaten paths of their fathers And while the majority may for a time have power to proclaim a principle, ofttimes has the principle been wrong, and it is, after all, the doubters who have been the promoters of development. "All honor to him who honestly doubts, if through doubt arises investigation, and through investigation conviction."

Difficult indeed, then, is the endeavor to place a just or even an approximate estimate on the value of current opinions. Years of distance seem necessary to give them a proper perspective, and absolutely impossible would be the attempt to strike an average: three opinions divided by three gives three opinions still. So if from the complex collection of variously expressed thought, I herein have not culled what your judgment would choose, I am grateful

*Read before the Thirteenth Annual Meeting of the American Academy of Ophthalmology and Oto-Laryngology, Cleveland, Ohio, August 26-28, 1908.—Being a continuation of the paper under the same title, read at the Twelfth Annual Meeting, Louisville, Ky., in 1907.

for your gift of charity. Not only with casual interest, but with positive gain, might we give a few moments occasionally to serious retrospection, and, as suggested by Jonathan Wright, we may smile through comparison, but probably no more contemptuously than future historians will at some of our own ideas of etiology.

Strange does it seem to us to read (Jonathan Wright's History of Laryngology) that John C. Cheesman in reporting in 1817 a case of papilloma of the vocal cords dying without relief, was the first man in America to describe a laryngeal growth; that Albers in 1834 stated that tumors in the cavity of the larynx belong to a class remarkable alike for their rarity and their characteristic symptoms; and that in 1837 Troussean and Belloc could only report from literature and their own experience seven cases.

In the same year (1837) Fredrick Ryland, in his book, "Diseases and Injuries to the Larynx and Trachea," states regarding acute laryngitis that the mortality is very great—of twenty-eight cases reported, eighteen died. "But this," he says, "gives a too favorable view of the termination,—to be accounted for by the disposition of mankind to vaunt of their successes and conceal their failures." He divides the treatment into three divisions: (1) "Bleeding to the extent as to produce an approach to syncope, without absolute fainting." (2) "Leeches crowded all over the upper part of the neck." (3) "Bronchotomy, which is no good unless done early." Of tumors of the larynx he states "there are various species of accidental or morbid formations which may be developed in the cavity of the larynx, but from the infrequency of their occurence and the undistinguishing character of the symptoms they give rise to, they generally remain undetected till after death."

The first class of tumor he takes up is "Hydatids:" "Most of these cases in the larynx, described by ancient writers, are considered by Albers to have been nothing but oedema of the glottis. Hydatids, however, have been found in the air passages, but in most cases they are originally formed in the lungs, liver, or thyroid gland, and subsequently burst into the air tubes. A hydatid developed in one of the ventricles of the larynx has been known to project so far into the cavity of the organ as to give rise to all the symptoms which usually attend a foreign body there." Polypus: "By far the most common tumor, but not indicated by any very characteristic signs, so consequently the disease is seldom discovered until after death." Treatment: "If it were possible to ascertain

the existence of a polypus in the larynx during life, it would be the duty of the surgeon to attempt its removal by the knife or by ligature around its base. For this purpose it would be necessary to divide the cricoid cartilage, and probably the thyroid also; but since the consequences of the polypus, if allowed to remain, are always mortal at some period or another, it would be right to give the patient this chance of relief from otherwise certain destruction. I am not aware of any case in which this operation has been undertaken. Other tumors have been occasionally described as scirrhous, though true scirrhous or carcinomatous affections of the larynx have seldom, or perhaps never been found except when the disease has been propagated from the pharynx or oesophagus."

In 1850 Ehrmann was able to collect in all thirty-one cases of tumors in the larynx.

In 1854 Robert Hunter published in New York a little volume entitled "Diseases of the Throat and Lungs," which as an example of some of the impressions sent out to appeal both to the physician and the lay mind is well worth quoting in this connection: "Laryngitis is one of the most terrible of maladies. There are few indeed of those who have been its subjects who have not also been its victims. The treatment of laryngitis has, I conceive, been much improved within the past ten years. The old routine—bleeding from the arm, calomel purges, and leeches to the neck, will end in failure in three cases out of four. I do not say that it is not often advisable to bleed and beneficial to purge, but I do mean to say that if something more be not done, there are three chances for the patient to die, to one that he will recover. What then is that something? It is to make a direct local application to the part affected, to depress the tongue so as to elevate the epiglottis and open up the entrance into the larynx, then to pass into it—as advised by Belloc and Trousseau—a sponge charged with a strong solution of nitrate of silver. This is frequently difficult even to those who have had much experience and always so to the general practitioner, to whom, however, it is unavoidable to delegate it under the urgency of the circumstances. The stake is life and the grim tyrant, death, is already in the field with his entire force. The battle must be fought before the strength is exhausted, or it will be lost in spite of all our art has to offer. Again and again, then, at intervals of a few hours the application must be repeated until imminent danger is past. In the interim between the applications of the sponge, anodyne and

emollient inhalations as hot as they can be borne must be kept up from a suitable instrument; quiet enjoined, a diet of water gruel which together with good nursing will complete the victory and rescue the patient from the jaws of death in three cases out of four."

In reference to tumors he has this paragraph: "In addition to inflammation, acute and chronic, the larynx is liable to abscess, to warty growths, and to polipi."

With the advent of the laryngoscope a great impetus was given to the study of laryngeal affections—and likewise, probably, to over-enthusiasm.

Lewen, in 1861, said that he had thus far seen fifty to sixty cases of laryngeal neoplasms, and that they were present in five or six percent of all laryngeal affections. Following the publication of Morell Mackenzie's essay, in 1871, on "Growths in the Larynx," world-wide enthusiasm was aroused, and for many years nearly every writer on the subject of laryngeal tumors seemed to make it his aim to *corroborate* the teaching of Mackenzie rather than to *test* it. In a measure this was right, since his record represented the careful observations in a large experience of a masterful mind pledged to high sincerity—which none could fail to recognize. But we beg for him tribute more worthy than worship; instead of mere praise, may we pledge him performance, and seek to make progress in the path he has pointed. And while even to this day are his tenets, as then published, for the greater part regarded as orthodox, within recent years writers have broken away from the old custom of reporting the cases that follow his findings, and have dared to record original research and independent thought. So, again I say, all honor to anyone who in the search after truth—armed with the assurance which earnest application with high sincerity gives—is emboldened to defy the very foundations of the old dogmas if need be, and thrice fortunate is he who can see the new faith accepted ere his voice be silenced in sacrifice upon the altar which he has reared!

Mackenzie's observations began in 1862, and in eight years he had seen one hundred cases himself, and was able to collect the reports of one hundred and eighty cases by others published since the introduction of the laryngoscope.

Of the benign laryngeal neoplasms, the classification has remained but little changed during the past thirty years. Always have papillomata been regarded by far the most frequent, with fibromata

next in order, and cysts probably third, though far less frequently observed than fibromata.

Angiomata, lipomata, adenomata, and myxomata are rare as compared with others, and will be considered collectively.

Papillomata, being the most frequent, are hence the most important from a practical standpoint. They may occur at any age, though perhaps more frequently in children, with this notable difference, that in adults they are more commonly single, and in children multiple. The tendency to recur after removal is more marked in the multiple variety. Arising in the majority of cases from the vocal cords, they may be found on the laryngeal surface of the epiglottis, the ary-epiglottic folds, the arytenoids, ventricular bands, ventricles, interarytenoid space, and from the tracheal wall below the glottis.

According to location and size, the presence of papillomata may be manifested by alteration in voice, varying from slight hoarseness to complete aphonia, cough, shortness of breath, stridor—particularly in children during sleep, and even alarming dyspnea and cyanosis to the point of complete suffocation. Any one of these symptoms, however, is but an indication for either direct or laryngoscopic inspection, by which methods only can a positive and accurate diagnosis be made.

No single cause or group of causes can be assigned as common to the production of these growths, though there is probably in each case some inherent predisposition (whatever that may mean), to which is added some form of local irritation, such as might result from acute infectious diseases, laryngeal irritation associated with repeated colds, diseased tonsils, adenoids, inhalation of irritant vapors, faulty instrumentation in treatment, or from any form of traumatic injury.

The treatment is surgical, and as to the method the advice adopted by the International Congress of 1881 is as generally accepted to-day as it was then—namely, "that every benign laryngeal tumor ought, if possible, be removed per vias naturales, and only if an experienced laryngologist has established the inexpediency of this method may the extra-laryngeal operation be adopted." An exception to this rule is that of multiple papillomata in children, in which the majority of evidence seems to be in favor of non-interference with the growth itself, with an attempt at absolute rest of the larynx by means of tracheotomy.

J. Payson Clark, in a report last year of fourteen cases of papilloma in children treated in the Massachusetts General Hospital, asserts as a fundamental proposition that "These growths will not yield to any form of treatment which has been attempted, however radical, until the period of active growth has passed. Cases of active recurrence belong exclusively to childhood, when the cell activity of the organism is at its highest." He favors the tracheotomy treatment with non-interference and believes that the greater familiarity of operators with Kierstein's autoscope and Killian's tubes has made more remote the possible necessity of resorting to thyrotomy in any case.

Delevan, in the discussion of a case reported by McCreery treated by tracheotomy, favors the same method and adds: "The growths are apt to recur up to a certain age, after which the tendency to recur diminishes. If, however, recurrence should take place later, it may be possible to operate with some chance of success."

In discussing the same paper, John Rogers, in contrast to the others, stated that he believed recurrence to be due to deficiency of excision. He had operated on two cases by opening the larynx and trachea, removed the papillomatous growths, then after the introduction of an intubation tube closed the wound completely. There had been no recurrence one year later. He doubts whether the risk is any greater than with tracheotomy, and believes it preferable to subjecting a child to the wearing of a canula for two years, with the possibility, even then, of ultimate failure.

In my own limited experience with papillomata in children, I have seen but one case in which I believed external operative interference indicated, and in which the condition disclosed during operation and the results following seem amply to have justified that procedure. I have purposely withheld both from last year's paper, and from this any reports of my own cases. This one being of peculiar interest in this connection, however, I shall summarize the principal points—a full report of which will be incorporated in a later paper, which I now have in preparation on Laryngeal Neoplasms, both benign and malignant, coming under my own observation.

Case 1.—I. H., female, aged 8 years, with nothing in family or personal history bearing on the case, was referred to me December 2nd, 1907, by Dr. Hummell, a general practitioner of Salem, N. J. He had seen her only the day before for the first time, finding her in a state of marked dyspnea with occasional spells simulating strangulation. He was able to obtain a sufficiently clear view with

the laryngoscope to detect a growth involving the epiglottis and entirely obliterating the view of the larynx, or the extent of the tumor, and advised the child's mother to bring her immediately to my office.

The history of her trouble as obtained from her mother, and also from the child, who was unusually bright and intelligent, was that about fourteen months previously the child was suddenly "taken hoarse over night," and had never spoken in louder tones than a whisper since. Her family physician gave her some medicine to take which was changed several times, but never with any apparent improvement in her voice. Eight months later she "changed doctors," the new one putting her through a course of internal medication, and likewise without appreciable results. Following this discouragement, she was taken to a hospital dispensary, where for the first time a laryngeal examination was made, and the mother was informed that "the child had tuberculosis of the throat, that she did not require any treatment, that she probably could not live long anyway, and the best thing was to keep her in the fresh air as much as possible, and feed her well, especially on eggs and milk." Up to this time there had not been any difficulty with breathing, nor was pain at any time present. Shortly following this time, however, which was three or four months before this history was taken, she began to have what her mother described as smothering and coughing spells, which gradually grew worse till she "had to be fanned all night to prevent her suffocating."

It was at this stage that I first saw her in my office on the evening of December 2nd. I have never seen a more tractable child. This circumstance enabled me to obtain a most satisfactory examination. Sitting erect, with head thrown well back, chin elevated and mouth wide open, the drawing out of her tongue afforded slight relief in respiration. The laryngoscopic image thus obtained was that of a nodular mass extending from the insertion of the right palatoglossus muscle and the base of the tonsil, across the base of the tongue, involving the glossal surface of the epiglottis to the median line, and practically the whole of its laryngeal surface. The growth was of sufficient size to obscure any further view of its extent into the larynx.

She was sent at once to the Jefferson Hospital and prepared for operation. Under ether anesthesia—which with manipulation of the head position and tongue she bore remarkably well—the growth was removed from its attachment to the tongue and from both surfaces of the epiglottis. Both faucial tonsils—cryptic, necrotic and

submerged—were enucleated, and a small mass of adenoid tissue removed from the vault of the pharynx. The labored breathing was then only partially relieved, and by digital examination I was able to determine that the growth almost completely filled the larynx both above and below the vocal cords, and involved both cords themselves. Enough of the remaining mass was then removed to relieve, to some extent, the breathing, and the operation discontinued to prevent any further exhaustion, since she was somewhat emaciated and greatly weakened, more through loss of sleep, perhaps, than from lack of nutrition. Two days later she was allowed to go home, being informed that if she continued to breathe sufficiently well, I would like her to have several weeks' rest and then return for another operation.

Convalescence was rapid, respiration more comfortable and deglutition unimpaired, though there was no improvement in her voice. On January 22nd, she was again admitted to the hospital, thyrotomy performed, the entire growth removed and a ten per cent solution of nitrate of silver applied to the area of attachment. An intubation tube was then inserted, and the wound closed with deep catgut sutures and silk sutures externally. Three days after operation the tube was withdrawn. On the tenth day the patient went home, the wound having healed by first intention, with the exception of a small stitch-abscess at the lower border, which, however, was entirely healed when she was brought to the office a week later. Within a month after operation she was speaking in distinct vocal tones, though coarse in quality, with slight huskiness. From the time of the first operation for about two months she was given syrup of iodide of iron with simple syrup of hypophosphites.

Sections from the growth removed were examined by Dr. John Funke, Pathologist to the Jefferson Hospital, whose report is here given:

"Patient:—I. H., Salem. Specimen:—Tissue from tumor on epiglottis. Specimen consists of five pieces of tissue each measuring 0.5 cm. in diameter; combined weight 0.4 gms. They are pinkish red in color, rather smooth, glistening and covered for the most part by mucous membrane. One side of each is fragmented, pinkish red and granular—indicating that the tissue has been dissected from adjacent structures. The pieces were fixed in Heidenhain's solution, embedded in paraffin, sectioned and stained in hematoxylin and Van Gieson, also with polychrome blue and carbolfuchsin, then decolorized with Pappenheim's stain.

"Histology:—The sections are covered at points with stratified squamous epithelial cells resting in some places upon a delicate strand of fibrous tissue, apparently basement membrane. At other places the basement membrane is invisible, the epithelium appears to penetrate the sub-mucosa—this displacement being due to perverted growth of the elements, which, however, are somewhat malformed. They are more or less spindle-shaped, the nuclei are intensely basic staining and the protoplasm acidophilic and granular. At one point the epithelium is covered by a mass of necrotic tissue in which there are but few fragments of cellular elements. The sub-mucosa is abundantly infiltrated with small round mononuclear cells containing small round intensely basophilic nuclei; the protoplasm is very scanty. Most of these are probably hyalin cells. Polymorphonuclear leukocytes were not found. Besides these cells are many erythrocytes. The blood-vessels are numerous, have very dense walls, and are distended with red blood cells. Many have ruptured. The hyalin cells are especially abundant around the blood vessels. At one point in the sub-mucosa is a mass of round mononuclear cells containing small, round, intensely basophilic nuclei. The protoplasm is scanty, granular and basophilic. In places the cells are closely packed or grouped, resembling the structure of secondary lymph nodes. The deeper architecture is composed of dense wavy fibrous tissue, infiltrated at some points by mononuclear cells, probably hyaline in type. Here the blood vessels are less numerous and have better formed walls. Neither tubercle bacilli nor other bacteria were found.

"Diagnosis:—The condition is in all probability merely an inflammatory product, the nature of which could not be determined. There is no change indicative of tuberculosis, nor do the alterations present suggest malignancy. Respectfully submitted,

(Signed) "JOHN FUNKE."

Fibromata differ from papillomata in their firm, dense, fibrous consistency, and regularity of contour. Usually of a rounded or oval shape, they are in most cases found attached to the vocal cord, and may have either a sessile or pedunculated base. They occur most frequently in adults, though Thomas J. Harris reported in 1905 a fibroma in the larynx of a child three years old. The etiology is no more clear than that of papillomata, and they rarely show any tendency to recur after removal.

Laryngeal cysts are far more rare than fibromata, yet they have been reported by many authors. D. Braden Kyle (Diseases of

Nose and Throat, 1907,) states that "there seems to be considerable confusion in the classification of cysts, due largely to different views as to the etiology and pathology of the various forms"; and that "the distinction does not seem to be made universally between cystic degeneration and a true cyst." Simple or retention cysts (mucocele) he observes, are "common in the nose, naso-pharynx, and in the upper portion of the larynx. The cystoma—which may be found in the nose, naso-pharynx, pharynx, or larynx—is a cystic dilatation of the lymph vessels normally present." They may occur at any age, though more commonly found after twenty-five.

D. Crosby Green reported in 1907 a laryngeal cyst in a child nine years of age, symptoms of which had existed since infancy. He further calls attention to three reported cases of cysts of the epiglottis in the new-born, causing death, and suggests that they may be more frequent than is generally supposed.

Cysts of the larynx occur most frequently, perhaps, attached to the laryngeal surface of the epiglottis, and to the ary-epiglottic folds. Occasional tendency to recurrence is attributed to incomplete obliteration of the sac.

Angiomata, lipomata, adenomata, myxomata and chondromata, with all other distinct or combined varieties of new growth, are for the most part interesting phenomena because of the rarity of their occurrence. They present no characteristic differences in symptomatology, nor would any attempted prophylactic measures be practical, owing to the rarity of their occurrence, even though the etiology were known. Confusion in diagnosis may, for a time, be a disturbing feature, but even that, with our present knowledge of the more important neoplasms, may be obviated with little difficulty.

The treatment is either surgical, or that of non-interference—the size, location, and duration of the tumor when detected, with the presence or absence of disordered function of the larynx, being the determining factors.

Operation via naturales—When operation is determined upon, a careful preparation of the patient cannot be too strongly insisted upon—the most important part of which is to secure the absolute confidence of the patient. While in some cases the larynx may be cocainized and a growth removed at the first sitting, yet with many patients, even though free from pain, a certain amount of nervousness from the sight of instruments and the consciousness of an operation being performed is a disturbing factor which must be overcome. Thus it has been customary to carry the patient through a

course of "training," by various manipulations about the larynx till such can be accomplished with but slight excitation of the pharyngeal and laryngeal reflexes. The length of time required for this procedure involves the personal element on the part of both patient and physician. When the tissues have attained a sufficient degree of tolerance, arrangements may be made for the actual operation. Previously administered bromides, or a hypodermic injection of morphia ten minutes before the operation, *for the patient,* and an acquired immunity to *impatience* on the part of the *surgeon,* who is also saturated with pure and unadulterated tact and common sense, will, in the majority of cases, prove most effectual accessories.

The technique of operation I shall omit. For each factor which the past generation has given toward the perfection of laryngeal surgery, let us not forget to be grateful. The praises of cocaine in its conquest of pain, and of the laryngoscope in its light on diagnosis, have been sung in unison by the universe; advance in pathology has shared in the praise, and likewise the principles of antisepsis; but one which needs an added note in the final grand chorus of recognition is the high perfection in the instrument-maker's art, without which the greatest gift in surgical skill would be hopelessly handicapped.

Following the removal of the growth, it is deemed wise to apply to the base or point of attachment a caustic solution, nitrate of silver or even the actual cautery having been employed successfully. In the case of recurrent papillomata in children, it has been observed that the application of or spraying with formalin, in varying strengths from 1 : 1000 to 1 : 100 solution, seemed to terminate the tendency.

The after care of the patient consists in complete rest of the larynx till healing is complete, during which time the site of operation may be kept clean by an occasional alkaline spray or the gentle application of a bland oil solution.

For the same reason that I presented last year the subject of carcinoma for the beginning of my paper, namely, that it is the most important, do I now wish to close this one with brief reference by way of emphasis of the same condition.

The past year has not proved prolific with new theories, yet there has never been so much thorough, conscientious and intelligent work carried on in the field of original research as now. While there is no desire on the part of anyone to discredit the doctrines of

other decades, within the past ten years there has developed a greater desire for reason in the search after truth than the world has ever known, and our motto and our mission is "Prove all things, that we may *know* to hold fast that which is good."

From recent literature on carcinoma I quote the following from Crile: "It has been stated, and I believe truly, that the greatest outstanding obligation of medical science to mankind is the discovery of the cause of cancer, or at least, of a cure for it. There is at present a universal movement in this direction. Governments and individuals have provided funds for laboratories and hospitals, and many of the greatest minds of to-day are engaged in an effort to solve the cancer mystery. There is evidence that a reliable blood test for cancer may be established, and there is a possibility of utilizing for cure the immunity principle through transfusion of blood.

"A number of cases of sarcoma have been cured with Coley's toxins, and according to Coley, the post-operative use of mixed toxins is an aid.

"Relative to etiology, we may conclude that chronic irritations, ulcers and benign tumors are potential cancers, and should be considered in that light. The pre-cancer stage is the prophylactic stage, and while the treatment of pre-cancer states and benign tumors is effective, easy and safe, the treatment of developed cancer is to-day, perhaps, the most difficult problem of surgery."

Then what of the future? The present is the product of all the past, the sum total of failures and successes. Equipped in this armor, we face the endless range of unborn years. May Truth be crowned the victor.

No. 1700 Walnut Street.

The Effect of Fowler's Solution upon the Ear. ALBERT BLAU. *Archiv f. Ohrenheilkunde*, July, 1905.

The author killed a number of mice and guinea-pigs with arsenic and found changes in the ganglion-cells in the coehlea, similar to the changes produced by quinine and salicylic acid.

YANKAUER.

A CASE OF PARALYSIS OF THE LEFT VOCAL CORD CAUSED BY PERITRACHEAL TUMOR.*

BY W. E. CHENERY, M. D., BOSTON.

Without discussing the etiology of paralysis of the vocal cords, I wish to report this interesting case:

J. F., male, age 53, was first seen by me at the St. Elizabeth clinic, July 21st, 1907. He complained of hoarseness—no pain. He was born in Ireland and was by trade a plasterer. Family history was negative. Past history except for occasional colds very good. No history of syphilis or accident. He had been accustomed to hard work. Bowels regular and urine normal.

The present illness began one week before. He had been playing the flute for several hours and in imitating a bag-pipe, said he had "strained" his throat. The next day he could not speak above a whisper and had remained hoarse. He coughed occasionally with slight expectoration. There had been loss of weight. He was well developed but poorly nourished. No glands were felt anywhere. The nose and nasopharynx were negative. The color of the mucous membrane of the mouth was fairly normal.

Examination of the larynx showed the left cord motionless and in the cadaveric position. The left arytenoid did not move. All motion was on the right side. There was no evidence of ulceration or thickening anywhere. Color of cords nearly normal. The trachea was in the middle line. There was no dysphasia, no stridor, air seemed to enter bronchi well. Radial pulse synchronous. There was no evidence of central lesion.

Physical Examination. Heart—Apex beat in the 5th interspace. Sounds clear and regular. Pulse normal in rhythm and tension. No signs of aneurism of the aorta.

Lungs—Slight dullness at both apices to the 2nd rib and in both backs to angle of the scapula. Numerous fine râles, vocal fremitus increased.

Abdomen—negative; liver and spleen not palpable.

Extremities negative, reflexes present.

The probable cause of the paralysis was interesting. There was no history or evidence pointing to central lesion. Aneurism seemed

*Read before the Eastern Section of the American Laryngological, Rhinological and Otological Society, at Boston, January 4, 1908.

to be ruled out by absence of signs. He had had no rheumatism, injury or disease except slight cough. The larynx did not show any evidence of tuberculosis. His age suggested pressure of the recurrent nerve from a new growth as to the probable cause, although its location could not be determined.

The patient then disappeared. Wishing to study the case further I sent for him at his home. He had been drinking and had developed an acute process in the lungs. He was sent to the hospital, where he died September 8th, 1907.

Six hours after death Dr. Timothy Leary made an autopsy and I append his report.

"On the left side of trachea lies a tumor mass 3x2x2 cm., arising apparently in the peri-tracheal connective tissue and situated opposite the third to the tenth tracheal rings, inclusive, lying in part posteriorly—between trachea and oesophagus. New growth is a moderately firm mass and is closely attached to trachea. Opposite its mid-portion are seen two small flattened oval nodules projecting above the mucosa of trachea and corresponding in position to the sixth and seventh tracheal rings.

"New growth is penetrated below by the recurrent laryngeal nerve posteriorly, and anteriorly shows a second nerve trunk of considerable size, which may be the cardiac nerve of the sympathetic, a cardiac branch of the vagus, or possibly an aberrant cardiac branch of the recurrent laryngeal. The latter seems to be the most reasonable supposition, since the only nerves which can be identified as coming from the upper part of the tumor are the posterior thyroid branches of the recurrent laryngeal and, posteriorly, the main trunk, to the larynx.

MICROSCOPIC EXAMINATION.

"New growth consists of a branching epithelial meshwork imbedded in hyaline connective tissue. In the younger portions of tumor the strands of epithelial cells are broad, and the polymorphous cells are well preserved. Mitotic figures are rare. In the older portions epithelial strands are slender, cells are fused, and concentric whorls of necrotic cells are abundant. The connective tissue in the more active part of growth is cellular, but shows a relatively large amount of hyaline intercellular substance with few fibrillae.

"In the older portions connective tissue shows few cells, which are vacuolated, and intercellular substance is wholly hyaline. In the central part of the growth large regions are neurotic.

"Tumor is extending into surrounding fat along perivascular lymphatics.

DIAGNOSIS.

"Peri-tracheal epithelioma.

"Death in this case was due to a bilateral pneumococcus pneumonia which was much more marked on the right side. On the left side process was limited to the base, consolidation was lax, and not homogeneous, some regions containing air. On the right side the process included a large part of lower lobe and consolidation was general.

"The left apex contained some obsolete tubercular foci.

"The other organs presented the usual picture seen in general septicemia, i. e., albuminous and fatty degeneration."

No. 222 Huntington Avenue.

Foreign Bodies in the Larynx and Tracheo-Bronchial Tract. L. D. BROSE. *Med. Fortnightly*, Dec. 25, 1906.

Three cases of the kind are cited: One of extraction of a foreign body in the larynx by means of a long bent probe hooked from behind forward.

The second case was operated upon by preliminary tracheotomy, as it was deemed inadvisable to remove the piece of apple seen lodged in the upper part of the trachea just below the true vocal cord, lest its displacement might cause suffocation by lodging it in the deeper air passage.

The author though he states he has been a visitor in Killian's clinic, and though his general views of treatment agree with those of Killian, would, for instance, adopt expectant treatment, "when the body is of small size, smooth, and in a bronchus."

Killian, however, (*Laryngoscope*, Dec. 1906, p. 925) states that "tracheotomy ought to be done only in cases of necessity, as for example, where urgent dyspnoea is present; . . where the aspirated foreign body is unusually large or of irregular shape, pointed and sharp," so that injury in the region of the larynx might ensue, etc.

EATON.

REPORT OF A FATAL OPERATIVE CASE SHOWING DEVELOPMENTAL ABSENCE OF THE OUTER SPHENOIDAL WALL AND IN ITS PLACE A LARGE VEIN COMMUNICATING DIRECTLY WITH THE CAVERNOUS SINUS. AUTOPSY.*

BY F. P. EMERSON, M. D., BOSTON.

June 28th, 1904. Eva H. S. L., 60 Blank St., Dor. Referred for treatment by Dr. B. Born, Mass.; 21 years; occupation, school teacher.

Past History—Catarrh since childhood. After eating frequently gags and vomits, which releases thick tenacious mass from the posterior nares. When vomiting does not occur, the act of eating excites hawking so that she has to leave the table. To avoid this she has of late used an anterior douche previous to each meal. There is pain over the bridge of the nose. Diphtheria at five years of age; severe attack. Light attack of measles.

Examination—Ant. nares normal—pharyngeal vault shows a tenacious mass covering its entire surface. Pharynx is glazed and dry. A bullet pointed probe shows a carious area in B. Sphenoidalis. General condition good.

July 5th—R. Ant. sphenoidal wall removed with Gruenwald forceps, together with Ant. end R. Mid. turbinate.

April 15th, '05—L. Ant. sphenoidal wall removed, together with Ant. end L. Mid. turbinate. Carious area on floor and inner wall curetted.

March 24, 1906.—No symptoms except some dryness of the pharynx.

November 17, 1906—Came back complaining of a return of former symptoms less marked. A large cell was found containing pus in the remains of the L. Mid. Turb., which was opened and drained.

May 25th, 1907—A thin tenacious grayish coating was found still present over the pharyngeal vault. Patient said that this still troubled her about twice a week. A thorough examination was again made, and in the R. sphenoid a carious area was felt on the outer walls with a soft mass posteriorly. This was taken to be

*Read before the Eastern Section of the American Laryngological, Rhinological and Otological Society, at Boston, January 4, 1908.

polypoid, and but little force was used in probing for fear of exciting hemorrhage. The middle turbinate and the anterior wall of the sphenoid had already been removed. A curette was introduced and turned toward the outer wall, and on the withdrawal there was a profuse venous hemorrhage and a convulsion. The patient was immediately unconscious. A rapid tampon controlled the hemorrhage externally, but symptoms of brain pressure supervened, and she was removed to the Charlesgate Hospital, where she died at 11 o'clock, seven hours after the accident.

Autopsy by Dr. Leary, of the Tufts Medical School, in the presance of Dr. Arnold, Courtsey, Swan and others. A hemorrhagic clot filled the calvarium. A large varicose vein was found to occupy a dehiscence in the outer wall of the R. sphenoid, which communicated directly with the cavernous sinus and was the cause of death. The remaining ethmoid cells were everywhere necrotic, and about one-half ounce of muco-purulent secretion was found.

No. 484 Beacon Street

The Most Rapid, Effective and Least Bloody Method of Turbinal Removal. C. C. MILLER. *Med. Fortnightly*, Oct. 26, 1908.

The "method" is by grasping the portion of the inferior or middle turbinated bone with ordinary six-inch hemostatic forceps, which have rather long jaws. The part is anesthetized by cocaine two percent on strips of gauze or cotton left in situ for about ten minutes. The jaws of the forceps are placed accurately above and below the hypertrophy, and then locked as tightly as possible. They are then rotated. They should not be pulled upon until they have been freed from the base of the turbinate by rotation. When the forceps are rotated, the bone snaps cleanly close along the margin of the jaws of the forceps, so that vessels running into the hypertrophy are left in large part sealed.

The author repeats the process a number of times.

EATON.

OZENA, NO TERRA INCOGNITA.

BY J. HOLINGER, M. D., CHICAGO.

The symposium on "ozena" which appeared in the June number of THE LARYNGOSCOPE owes its general negative tendency more to the technique of compilation than to the want of real investigation. Facts which have been ascertained by direct observation are here called theories, and are discarded. Single observations or findings in a small number of cases are regarded as equal in value to large statistics. In drawing conclusions the authors of the articles lay greater stress upon the differences in the findings of the original investigations than upon the conclusions at which they arrive in common.

If a man measures the width of several hundred normal noses and strikes an average of width for men and for women, then finds that about 90 per cent. of all ozena noses are wider than this average, he has not put up a theory but has discovered a fact, and any teaching of the etiology of ozena which ignores this fact is incomplete. Of course that does not mean that every wide nose stinks. This lies in the fact that in striking the above-said average a great many wide *normal* noses were measured. There must therefore be a second factor in the production of ozena, which we shall indicate later on.

The best illustration of this point, viz., that the ozena noses are wider than the average normal noses are the cases of one-sided ozena. In deviations of the septum the narrower side is often found free, while the wider side is full of ill smelling crusts.

A man of fifty-five has a big ridge on the right side of the septum and a few thin crusts which never smell and are easily removed by blowing. The left nose is wide, the whole middle turbinal is covered with ill smelling crusts which can only be removed with a cotton swab. The naso-pharynx and the pharynx are glossy, like a varnished surface, and very spacious. The larynx and especially the vocal cords show the typical appearance of pachydermia.

The ozena nose is therefore not only a wide nose, but even in the same nose, ozena is usually more pronounced or entirely confined to the wider nostril. This does not say that the ozena nose is wider than any other nose, but only wider than the average. It refers

to the bony nose, and is therefore a peculiarity of the form of the skull; therefore a racial peculiarity, and includes a hereditary predisposition to the condition.

Whenever we find ozena in a *narrow* nose we should remember that there might be other causes for the odor, for instance, syphilis, a foreign body, rhinitis caseosa, or a distinct focus or "Herd." But even if we find a "Herd" it is often difficult to say which is cause and which is effect, whether the "Herd" is the cause of the ozena or whether it is simply a special location of the ozena-changes in the nose.

For example, a girl of fifteen was dismissed from school on account of the smell. Both nostrils were filled with ill-smelling crusts, the turbinals were small and slender, the left nostril wider than the right. In the course of treatment the crusts and smell disappeared from the right nose within three weeks, and the turbinals became round and upholstered. In the left nostril the crusts were constantly located on the rear end of the middle turbinal. They finally disappeared after the posterior ethmoidal cells and the sphenoid sinus had been repeatedly washed out. No crusts nor odor have been noticed for the last six months, and the left middle turbinal is also becoming more rounded.

Why, in this case of a typical "Herd" should the right side heal and the left not, since the sphenoidal, as well as the ethmoidal sinus opens into both nostrils? Just as well as saying the "Herd" caused the ozena I may say the "Herd" was only a special location of the ozena-changes and a consequence of the ozena. This will become clearer when we consider the second factor in the production of ozena.

Attention has been drawn repeatedly to the changes of the epithelium of the nose in ozena, but it is surprising that none of the authors of the symposium mentioned the paper of Dr. Oppikofer (Vol. 19, Arch. f. Lar.) giving an account of macroscopic, bacteriologic and microscopic examinations of the contents and lining of the cavities and accessory cavities of several hundred noses. The technique was done strictly according to the very latest rules laid down, in order to avoid mistakes.

In order to exclude post-mortem changes the specimens were secured a few hours after death. The conclusions are based upon many thousand microscopic specimens and bacteriologic examinations representing the work of many years, and therefore certainly worthy of consideration. The work was done in the clinic

of Prof. Siebenmann who is an authority on pathology of the upper air passages, and especially on changes of the epithelium of the linings of the ear (cholesteatoma), the nose and the pharynx. Oppikofer says, (page 80): "35. In ozena, pavement epithelium is regularly found in the nose. Extensive stretches of pavement epithelium point to the fact that some serious damaging influence has acted on the mucous membrane.

"36. The amount of pavement epithelium in ozena is however not in proportion to the degree of hypoplasia of the turbinals or vice versa.

"37. The metaplasia of the epithelium of the turbinals in our cases is not dependent upon suppuration in the accessory cavities."

Metaplasia of the epithelium can be found without ozena. Therefore, as Prof. Siebenmann expressed it to me, *there is ozena when we find pavement epithelium, and especially hornified pavement epithelium, in a nose that is wider than the average nose.*

How does the pavement epithelium get there? Oppikofer says that its presence points to the fact that some serious damaging influence has acted on the mucous membrane. We may safely say that this influence is to be found in long standing suppuration. The careful examinations of the fresh secretions of the linings of the nose in ozena support this view. This suppuration may be caused by any pus-producing micro-organism, not excepting diptheria bacilli, which explains the curative effect of antitoxin in some cases. It is of course excluded that in such long standing suppurations only the mucous membrane is affected and the submucous tissue remains normal. The opposite is the case. The submucous tissue down to the bone and even the periosteum suffers. Scars and shrinkage are the result, just as in the shrinkage in interstitial nephritis, etc. The suppuration in the nose is sustained by bad hygienic conditions in the surroundings, especially dust, lack of fresh air, etc. Here I may mention that the crusts which were removed from the nose and nasopharynx of a man working in a wholesale cheese business smelled of cheese. Personal dispositions to suppurations are just as frequent, and especially noticed in children with their omnivorous tendencies for bad food in different variations and combinations. A similar tendency to suppuration is known in people who suffer from diabetes. A fine demonstration of this was furnished by the gentleman with one-sided ozena described above. Five years ago he complained of some symptoms for which Dr. C. S. Williamson examined him

and found some sugar in his urine. Strict prescriptions were given as to diet, etc., and without any further local treatment the crusts and odor, which for the previous two years had never been totally absent, disappeared. They re-appeared two years later when the patient had made a series of mistakes in diet for two weeks. Since then every winter when certain social obligations involve similar indulgences and in connection therewith an increase in the sugar, he has to undergo a course of treatments for his nose.

The treatment of ozena is more quickly outlined than accomplished. Wholesale treatment of fifteen to twenty-five patients an hour will never have any results. Repeated, careful, general examinations embracing, especially in children, a strict surveillance of the diet and hygienic conditions of their living apartments must not be neglected. Careful local treatment consists in the removal of all crusts and mucus with a non-irritating mild antiseptic, preferably concentrated warm boric acid solution. Whenever the crusts cling too tightly to the membrane the insertion of a pledget of cotton for several minutes to twenty-four hours will help to remove them. By means of the forehead mirror and speculum every vestige of crusts and secretions is removed and finally a soothing antiseptic applied. I prefer vioform powder insufflated by means of a good powder-blower for this purpose.

109 Randolph Street.

An Unusually Large Bone Cyst of the Middle Turbinate. ERNST SCHATZ. *Monatsschrift f. Ohrenheilkunde*, June, 1905.

The patient had suffered for a year from nasal obstruction on the left side. Two weeks after an attack of influenza she complained of intense pain and tenderness over the left eye. There was no discharge from the nostril. Upon examination, a large swelling was found in the left nostril, occupying the middle meatus, extending downwards between the lower turbinate and the septum, and pushing the septum over towards the right side. The mucous membrane over the tumor was edematous. The tumor was opened with a chisel, and pus escaped. The walls of the tumor were removed with forceps. Complete recovery followed.

YANKAUER.

HYPERKERATOSIS LINGUAE.*

BY ROBT. H. CRAIG, M. D., MONTREAL, CANADA.

When our worthy Chairman suggested that I should read a paper at this meeting, I felt honored, but rather diffident about acting upon his suggestion, as I have nothing of marked interest to bring before you; however, in looking over the records of cases that have come under my observation for some time past, I have selected two, which I trust will prove interesting, on account of their comparative rarity.

Hyperkeratosis Linguae (the hairy black tongue). Butlin states in his admirable book on the tongue:

"This is a condition which has excited a great deal of interest, although its clinical importance is very slight. It is produced by an overgrowth of the epidermis of the filiform papillae, but there is no production of true hairs. The color is black, but it may be sepia brown, or yellow, as described by Dinkler, or even blue (Mourek). The color has nothing to do with the overgrowth of the papillae, but is due to the organisms clinging to them."

"And whoever is familiar with the various colors which are produced by the agency of micro-organisms can not doubt the power of organisms on the surface of the tongue to produce the black or blue colors, whether by the presence of color bodies or by the production of a soluble stain coloring the epithelial cells."

Case No. 1. Consulted me about the middle of last January regarding the peculiar appearance of his tongue.

Examination revealed a dark brown, almost black, patch on the dorsal surface of the tongue, immediately in front of the circumvallate papillae. Interspersed through the colored area were many tendrils of what appeared to be black hairs about one-eighth of an inch in length, evidently elongated filiform papillae. The condition was unaccompanied by pain or other untoward symptoms.

The patient was under my observation for about a week, the area was cauterized with a weak solution of silver nitrate, and a cleansing mouth wash prescribed. The treatment resulted in but slight temporary improvement; I assured the patient, however, the condition was not dangerous, and he failed to report for further treatment.

*Read before the Eastern Section of the American Laryngological, Rhinological and Otological Society, Boston, January 4, 1908.

The history of this case failed to reveal any constitutional dyscrasia which might account for the condition. The patient admitted he was a heavy smoker, which might have accentuated, or possibly even caused the peculiar and rare appearance of the condition described.

Case No. 2. Male, aged 27. Patient had recently recovered from an attack of acute pharyngitis when he presented himself for treatment at the ear and throat clinic of the Montreal General Hospital.

Examination revealed almost the identical condition described in case No. 1, with the exception that it was not so pronounced.

A cleansing mouth wash was prescribed, and the patient was instructed to rub the tongue with a small swab, saturated in a weak carbolic solution, with the result that in three days' time the improvement was so marked the discoloration had almost disappeared. In this case the surface of the tongue was scraped, and microscopic examination by the house surgeon revealed many cocci and bacteria.

To quote Butlin again: "No explanation can be given as to the origin of the overgrowth of the papillae, except as regards the area in which it generally occurs. The dorsum of the tongue in front of the circumvallate papillae is the least exposed to friction, and it is here, if any, fur tends to be present.

"But Curtis saw a patient in whom the growth occurred behind the circumvallate papillae, a part specially free from air. Gener-

ally a black tongue causes no symptoms, and is discovered by chance. Vollmers' statement that in half his cases the patients were syphilitic is entirely opposed to all other accounts. The duration of the patch is variable, but ultimately it tends to disappear spontaneously.

"On the whole, the best treatment is to take off the patient's attention by assuring him the state of his tongue is a mere curiosity."

No. 186 Peel Street.

A LARGE CALCULUS FROM WHARTON'S DUCT.

BY RICHARD H. JOHNSTON, M.D., BALTIMORE.

During the past summer I was consulted by Mr. O. H. C. for a swelling in the right floor of the mouth. He had discovered it accidentally a few days before. No pain was complained of. On examination a hard, elongated mass was found extending from the submaxillary gland along Wharton's duct. The opposite side was normal. The submaxillary gland of the affected side was slightly sensitive to pressure, as was also the hard mass in the floor of the mouth. There were no other symptoms. From the location and consistency of the swelling, there was no doubt as to the diagnosis of calculus in Wharton's duct. In order to remove the stone, an unusually long incision had to be made. As is usually the case, it was intimately adherent to the walls of the duct and had to be dug out with a curette. The calculus measured 7-8 by 5-8 by 3-8 of an inch and weighed 28 grains. It seems remarkable that such a large stone could remain in the duct for any length of time without causing symptoms. The patient made a prompt recovery.

919 North Charles Street.

SOCIETY PROCEEDINGS.

NEW YORK ACADEMY OF MEDICINE.

SECTION ON LARYNGOLOGY AND RHINOLOGY.

Regular Meeting, November 25, 1908.

Wolff Freudenthal, M. D., Chairman.

PRESENTATION OF PATIENTS.

A Case of Laryngeal Carcinoma; Laryngectomy after Twelve Years' Observation. By HARMON SMITH, M. D.

In 1896, J. S., aged thirty-three at that time, came under the observation of Dr. J. W. Gleitsmann, who presented him to this Section. He complained of hoarseness, which had existed for a year, without pain, cough, or dyspnoea. There had been no loss of weight, and he had pursued his avocation without interruption. External examination showed nothing. Laryngeal examination showed a snow-white mass either upon the right vocal cord or protruding from the ventricle between the true and the false cord, and resembling, as Dr. Gleitsmann described it, "a piece of cotton tucked in the ventricle of Morgagni." The remaining portion of the larynx presented no anomalies. Two pieces of the growth were removed. The microscopical report of the second piece showed it to be a papilloma durum—probably malignant and perhaps carcinomatous.

The case disappeared from observation until August, 1907, when the patient turned up at my clinic at the Manhattan Eye, Ear and Throat Hospital. At the first examination I was inclined to believe the growth to be epitheliomatous or syphilitic, and placed the patient upon potassium iodide to eliminate the specific idea. The appearance had changed somewhat from that of the original picture, and only certain areas of the white could be seen. The ventricular band was very much swollen, and parts of the cord on the opposite side were hidden by some swelling of the ventricular band of that side. When Dr. Wright's attention was called to the case, he recognized it as the one reported eleven years previously by Dr. Gleitsmann. A piece of the growth was removed, and Dr. Wright reported it as probably pachydermia laryngis. The patient had no

pain, no enlarged glands, and had lost no suspicious amount of weight. Was only hoarse and complained of difficult breathing at times.

A second piece was removed in September, 1907, and Dr. Wright reported as follows: "There is considerable hyperplasia, with cornification of the surface layers, but the epithelium is dipping down into the stroma in atypical fashion. There is apparently not enough hyperplastic epithelial growth to account for the tumor. There is considerable nuclear fragmentation, which I suppose may be attributed to the previous endolaryngeal operation."

After each removal the patient felt very much relieved, and would willingly have had me remove a piece at each clinic attendance There was scarcely any hemorrhage or reaction after the removal. Several more pieces were removed and examined, and each time there were changes which led more strongly to the belief that the tumor was not benign. In January of 1908, the patient's condition began to get worse, and he gave evidence of general physical weakening. His hoarseness increased perceptibly, and his breathing became more difficult, until he was anxious to have something done to relieve his dyspnoea. The examination of the last piece removed at the clinic, April 8, 1908, was reported upon by Dr. Wright as follows: "I cannot but feel that this growth is now assuming a malignant histological appearance. (1) The separation between the stroma and the epithelium is becoming lost in many places. (2) The epithelial cells are becoming in such cases more atypical. (3) There is more penetration of the leucocytes, whose nuclei are more fragmented. (4) Cell inclusions, 'cancer cells,' and 'whorls' are beginning to suggest themselves. (5) The whole arrangement of stroma—glandular structure, is more confused. (6) The epithelial type varies more widely from typical columnar to typical flat stickle cells, with many intervening atypical forms. (7) There are several nuclei exhibiting markedly irregular karyokinesis. Altogether, the evidence now points strongly to a malignant growth."

The patient's general condition bore out the microscopical evidence of malignancy, though there had been no marked pain except a sensation of a foreign body on the right side of the larynx. There was a small gland sensible to palpation just below the larynx. The patient was suffering from marked dyspnoea, and was willing to have any operation performed to relieve this distress, a procedure he had absolutely forbidden previously.

He was turned over to Dr. Brewer for further surgical consideration. The larynx, after removal, was given to Dr. Wright, who reported as follows: "The examination of numbers of sections showed conclusively in some that the growth was malignant, but only certain sections showed this, and they were by no means the superficial sections. This proves conclusively that the ordinary measures for the removal of sections for microscopical purposes are frequently inadequate, and the reports therefore misleading." The chief points of interest in this case are: (1) The long-standing, slowly advancing malignancy of this tumor. (2) The almost positive belief in malignancy and yet the presence of sufficient doubt to make one refrain from operative measures. I believe that in the early stages this tumor could have been removed by thyrotomy, with a reasonable hope of non-recurrence. (3) The extremely small systemic manifestations for a malignant growth of such long standing.

DR. SMITH said that he regretted that he was not able to present the patient as he had expected, but that every effort had failed to locate him. He was last seen two months ago and was doing very well indeed. He had some very excellent drawings to illustrate the case, however, which he passed around.

DISCUSSION.

DR. JONATHAN WRIGHT.—(Dr. Smith said that Dr. Wright had been prevented from attending the meeting, but had sent a note in regard to the case, which he would read).—

"On looking over the reports I made you during the course of your observation of the case of Sigmond, and considering the results of the fuller report I made of the findings when the whole larynx was sectioned, I cannot but believe that we have had to do from the beginning with a case of mildly malignant epithelioma. So far as I am familiar with the history of the case, so far as my memory serves me of its appearance twelve years or more ago, and so far as I am acquainted with the histological findings by competent pathologists at that time, I cannot but come to the conclusion that the type of epithelial proliferation has not changed in that time. Sooner or later, even in its slow extension it was sure to reach the lumina of the larger blood vessels or involve the deeper lymphatic trunks. That it has not done so until lately seems probable, though very remarkable. I think that with the conditions of the structure as I have studied it, there is great likelihood that the atypical cells

have been carried off in the circulation to distant organs, with the consequent result of a probability that metastases will form. There is a likelihood, I think, that these metastases, if they form, will exhibit the same growth and sluggishness of development which have marked the original tumor, yet we cannot leave out of view the chance that some biological systemic change may occur with advancing years whereby the tissue resistance by virtue of which the growth has hitherto been held in check may decline, and we may have a more rapid course of the secondary growths. The chance of its having affected a more vital organ, or of its having reached a more favorable site of development for the atypical cells, must also be admitted."

Dr. Gleitsmann said that he had to thank Dr. Smith and Dr. Wright for the courtesy of seeing the case again. They had invited him to the Manhattan Eye, Ear, and Throat Hospital, and he had seen the patient several times. Dr. Smith had overlooked one point in his report, though perhaps not a very important one. When the patient was under observation in the beginning, the physicians at the Manhattan thought that a thyrotomy would be sufficient to remove the growth, but the patient was unwilling. He himself had a patient on whom he had performed a laryngotomy for hyperplasis of the larynx, and he persuaded this patient to go with him to the Manhattan and show the other man the good result, but the latter declined to subject himself to a laryngotomy. Dr. Smith's remarks had covered the whole case.

A most important point from a scientific point of view was the nature of the growth at its first appearance. A dozen or so years ago, Dr. Semon, in the *Centralblatt f. Laryngologie,* made an investigation, and physicians from all over the world reported about the possibility of the transformation of a benign growth into a malignant one. It was apropos of the case of the German Emperor. The result of the investigation was that only one or two reported on the possibility of the transformation. In this case we have undoubtedly a growth in the larynx which remained dormant more or less since 1896, without interfering with the patient's comfort, health, or occupation, and only appeared in its true nature a year and a half ago. These snow-white growths, such as the patient showed in 1896, should always arouse suspicion of malignancy, as Semon stated as early as 1895.

In all of these cases the growth proved to be, or to become malignant. The question is—can a malignant growth remain

dormant in its effect on the system, and not come to a fatal issue for a term of twelve years? Dr. Wright, Dr. Semon and himself were of the same opinion.

DR. FREUDENTHAL said that when Dr. Gleitsmann had first showed this case he himself had not any like it, nor had he seen such a case since, but of course from the history and the pictures he now believes it was carcinomatous from the start. This diagnosis he bases on the fact that carcinomatous conditions may remain latent in any part of the body for many years. They may remain stationary in the female mamma for years, and why may they not do the same in the larynx? At the time, however, when he first saw this case, it did not impress him as being carcinomatous.

DR. CHAPPELL said that he had seen the case at various intervals of time, and believed that it was malignant from the start. The pieces taken for examination at different times were superficial, and had it been possible to get some of the deeper tissue earlier the malignancy would have been discovered sooner. If the doctors had been earlier convinced of its malignancy, they would doubtless have used greater efforts to induce the patient to undergo operation years ago, and if he had had the growth removed when Dr. Gleitsmann first saw him, or a few years later, he would probably have made a complete recovery without the necessity for a laryngectomy to which he has now had to submit.

DR. SMITH, in closing the discussion, said that he regretted that Dr. Brewer had not dwelt more in detail upon the method used in removing the larynx. A preliminary tracheotomy was performed, and the patient allowed to get accustomed to breathing in this way for ten days prior to the operation. After the removal of the larynx the patient was kept in an upright position in bed, with a tube running through his nose into his stomach, through which he was frequently fed instead of being starved or receiving rectal alimentation, as has been the custom. He seemed happy and in good spirits, and had none of the depression which usually accompanies such operations. He hoped yet to be able to bring the patient before the Section.

Mycosis. By J. H. ABRAHAM, M. D.

The patient, a trained nurse, had kindly consented to appear before the Section. The case was seen for the first time in the afternoon, and there had not yet been time to go into it very carefully. There were large tufts of mycosis and also at the base of the left

side of the tongue. There was no pain or other symptoms, excepting now and then a little sticking sensation. The patient has been on one case for two years, and whether or not that had anything to do with reducing her vitality was a question.

PRESENTATION OF PAPERS.

A Study of the Anatomic Relations of the Optic Nerve to the Accessory Sinuses of the Nose. By HANAU W. LOEB, M. D.

SUMMARY.

To summarize, the following has been observed in the study of these fifteen heads, with respect to the relation of the optic nerve to the accessory cavities of the nose.

1. The sphenoid sinuses vary as follows: antero-posterior diameter 2 to 42 mm., supero-inferior 4 to 36 mm., lateral 2 to 35 mm., averaging, respectively, 21.5, 22.8, 18.4.

2. The opening of the sphenoid into the nose, in the great majority of cases, is about midway between the floor and the roof of the sinus. In some instances it is much closer to the roof.

3. The diameters of the ethmoid labyrinth and its component parts, the anterior and posterior ethmoid cells, vary as follows: labyrinth, antero-posterior, 22 to 54 mm., supero-inferior, 17 to 59 mm., lateral, 9 to 28 mm.; anterior ethmoid cells, antero-posterior, 9 to 40 mm., supero-inferior, 7 to 57 mm., lateral, 7 to 29 mm.; posterior ethmoid cells, antero-posterior, 13 to 32 mm., supero-inferior, 6 to 38 mm., lateral, 8 to 28 mm.

4. The diameters of the frontal sinuses vary as follows: antero-posterior, 9 to 33 mm., supero-inferior, 14 to 51 mm., lateral, 7 to 42 mm.

5. The diameters of the maxillary sinuses vary as follows: antero-posterior, 17 to 42 mm., supero-inferior, 17 to 47 mm., lateral, 7 to 33 mm.

6. The optic chiasm is usually in relation with one or both sphenoid sinuses; in no instance, in these heads, with the ethmoid. In more than half of the heads it lies posterior to the sphenoid cavity.

7. The optic nerve may be divided into a sinus portion and a free portion, of which the former is usually the larger, as shown by the variation, as follows:

Optic nerve, 34 to 55 mm., sinus portion, 17 to 32 mm., free portion, 12 to 28 mm. As far as could be ascertained, there is nothing in the extent and shape of the sinuses to account for the variation in the length of the nerves.

8. In five instances (one-third), one sphenoid is in relation with both optic nerves, the other sphenoid not participating; in two, the other sphenoid participates in the relation, and in one there is no relation between either sphenoid and one of the optic nerves.

9. There is a considerable variation in the distance between the optic nerve and the level of the lower margin of the nasal opening of the sphenoid, from 2 mm. above to 14 mm. below. In four instances, the opening is at the level of or above the optic nerve.

10. As a rule, the last posterior ethmoid cell (sometimes there are two) has a very slight relation with the optic nerve, at the postero-external angle just at the roof, and from this point the nerve passes externally to the bulbus, gradually increasing the distance which separates it from the labyrinth. In one instance, an anterior ethmoid replaces the posterior ethmoid cell and assumes the usual relation of the last posterior ethmoid cell. When the last posterior ethmoid cell replaces the sphenoid, the optic nerve runs along the external wall of the ethmoid.

11. The frontal is not in close relation with the optic nerve, except when it extends posteriorly in the region of the ethmoid cells. It is commonly in relation with the bulbus, but sometimes it is far removed from it.

12. The roof of the maxillary sinus, forming the inferior wall of the orbit, is below the bulbus and does not reach a distance nearer than 7 mm. from the optic nerve.

CLINICAL DEDUCTIONS.

In view of the cases of optic nerve involvement, due to sinus disease, as abstracted, and of the anatomic study described in this paper, the following clinical deductions are justified.

1. Optic nerve involvement without periorbital abscess, although heretofore thought to be an infrequent sequela, is common enough to merit consideration in sinus affections.

2. There have probably been many unreported cases.

3. In all likelihood many minor symptoms resulting from transitory involvement have been overlooked.

4. Whether the infection be lymphogenous or hematogenous, or by contact, the smaller the distance from the infecting focus, the greater will be the chance of the involvement of the nerve.

5. It, therefore, is uncommon for frontal or maxillary sinusitis to be accompanied by optic nerve disease without periorbital involvement. However, from their relation to the bulbus, disease by extension through it is not to be overlooked.

6. Sphenoid sinusitis would naturally be called to account as the prolific cause of the infection, but the sphenoid is less commonly affected than the other sinuses, and except in closed empyema, the pus is evacuated in a large measure through its nasal opening. Stagnant and decomposing pus is more or less common on the floor, in sphenoid empyema in that part farthest removed from the optic nerve; but this factor becomes more potent where the orifice is at the level or above the optic nerve, as shown in the four heads, and the likelihood of trouble is greatly increased by the immediate propinquity of the stagnant and decomposing pus, which, in these cases, is separated from the nerve only by a thin lamina of bone and the nerve sheath.

The six heads out of fifteen, shown and described in this paper, in which one sphenoid is in relation with both optic nerves, afford sufficient explanation for contra-lateral optic neuritis when caused by sinus disease.

7. The anterior ethmoid cells, which are so commonly affected with suppurative inflammation, are so far from the nerve that they are not likely to influence the optic nerve, except through the effect on the periorbita adjoining. However, where an anterior ethmoid cell is extensive enough to come into relation with the nerve by replacing a posterior ethmoid cell, as in Head XII., trouble is more likely to occur.

8. The posterior ethmoid cells, also frequently affected, have very little influence on the optic nerve on account of the meagerness of their relation, viz.: the postero-external angle at the roof of the cell, as I have pointed out in this paper. When the cell replaces the sphenoid and the optic nerve passes along the external wall, then the posterior ethmoid becomes the most potent factor of all, for the nerve is closer to the mass of pus and for a greater distance than under any other circumstances, even though the nasal opening may be in the dependent portion of one part of the cell.

9. It, therefore, becomes necessary to study more carefully the cases in which the sphenoid orifice is near the optic nerve and in which the sphenoid is replaced by a surmounting ethmoid cell.

DISCUSSION.

Dr. Ross Hall Skillern (Philadelphia) said that if the practical interest in this subject was as great as the scientific, blindness or severe eye affections from disease of the posterior ethmoid cells of sphenoid sinus would be a thing of the past. Owing, however, to the surgical inaccessibility of the pituitary region and the almost irreparable damage done the moment the disease progresses beyond

the borders of the accessory air cavities of the nose, the future seems to offer little in the way of treatment once this region has become infected.

As far as the practical interest is concerned, it is of small moment whether the optic nerve lies 5 mm. above or 5 mm. below the nasal opening of the sphenoid sinus, but it is of the greatest importance to know, as Dr. Loeb has pointed out, that this nerve may lie in direct communication with the sinus and in a position to share with it any disease which may affect its cavity. This knowledge, when applied, will clear up the question why a certain virulent empyema of the sphenoid sinus will run its course with only nasal and post-nasal symptoms, while another of less virulent type will suddenly assume grave symptoms after a comparatively mild course of weeks or months, with sudden death of the patient.

The thickness of the bony walls between the sinus and the brain is responsible for these vagaries. In the first case the drainage was good and the walls thick enough to withstand the attacks of the disease. In case No. 2, perhaps a sudden cold was acquired, the ostium of the sphenoid became occluded, resulting in stagnation of secretion, infiltration of leucocytes and pathogenic germs through the diploe, with subsequent meningitis, brain abscess, and death.

As far as the eye symptoms as a complication of sphenoid disease are concerned, to my mind it is a question to determine whether these symptoms are due directly or indirectly to the sinus disease—in other words, whether they are not due to some other condition dependent on the sinus disease. I refer here to thrombosis of the cavernous sinus, in which the ophthalmic and retinal veins practically always participate.

Of course in those cases where the optic nerve or commissure lies in direct apposition to the affected sinus, it is only natural to expect its involvement. On the other hand, we must not overlook the fact that derangement of sight may occur in connection with empyema of those sinuses and be totally independent of it. I recollect a case referred to me by Dr. De Schweinitz of our city, in which the man became totally blind about four months after the onset of the first symptoms. Examination showed disease of the left sphenoid sinus, which was corroborated by the skiagraph, although both of us were of the opinion that the sinus disease had been a factor in the etiology of the blindness. After all, the main point of interest to us as rhinologists, and especially to the patient, is the

early recognition of the condition. Congestion of the retinal veins in these cases is suspicious of involvement of the ophthalmic vein and is, of course, of the highest importance. Edema of the infra-orbital region points to congestion of the ophthalmic and ethmoid veins which should immediately put us on our guard for some disturbances in the sinus cavernosus. There is no question to my mind that many cases which have terminated fatally could have been saved had this condition been recognized as Dr. Loeb suggests, and a radical operation on the sphenoid instituted. This is well illustrated by the case recently reported by Kander before the South German Laryngological Society, as well as by another reported by me in the *Zeitschrift f. Laryngologie.*

Dr. Ward A. Holden said that the eye men early in the last century knew that dilatation of the sphenoid sinus might lead to blindness, but later the sphenoid was neglected until Zuckerhandl aroused the oculists' interest, and Berger then collected in his book many histories of cases showing the effect of sphenoidal and ethmoidal affections upon the eye. Berger believed, however, that the sphenoid alone directly disturbed the optic nerve, while the ethmoid cells affected the nerve only secondarily, after orbital cellulitis had been set up or the cells had bulged into the orbit. So, in cases of sudden failure of vision due to causes behind the eyeball, we had the noses of our patients examined for sphenoid disease, but with an almost constant negative result. Holmes, however, had the good fortune to restore the sight of a blind eye by a nasal operation, twelve years ago. An occasional case was reported abroad. In my own experience, years of search for an optic nerve affection of sphenoidal origin led to my finding two cases of blindness that I thought were of this category. In one, operative measures were refused; while in the other, a most thorough opening up of the sinuses caused no improvement in vision.

The oculists' interest in the accessory sinuses as a cause of optic nerve trouble flagged more and more until two years ago when the anatomical studies of Onodi, and his subsequent collection of cases showing the relations between the ethmoid cells and the optic nerve, taught us that many of our obscure cases of retro-bulbar neuritis might be explained and cured. A flood of reports of cases treated successfully has since come from all parts of the world.

Retrobulbar optic neuritis is the name given to an affection of the optic nerve behind the eyeball, characterized by a loss of vision in the centre of the field of vision (central scotoma), while the

peripheral limits of the field are at first normal. The defect in the centre of the field may enlarge until the entire field is involved, and the eye becomes blind.

The optic nerve head, as seen with the ophthalmoscope, is in some cases of unusual appearance; in others, edematous and swollen. Retrobulbar neuritis of a chronic type is caused by the abuse of alcohol and tobacco, diabetes, multiple sclerosis, the toxemias of pregnancy, syphilis, and the like. The acute cases follow grippe, simple coryzas, etc. In these acute cases we now look for ethmoidal disease which, however, is not always obvious. There are many records of cases in which the rhinologist has found nothing abnormal, yet removal of the middle turbinate has restored lost vision.

Among the cases that came under my observation last winter, the vision was restored to normal after operation in three eyes with acute retro bulbar neuritis. In one case of chronic bilateral retrobulbar neuritis, vision was not improved by operation. In one case of sudden blindness with normal eyegrounds in each eye, some improvement followed on one side an operation ten days after the onset. In another case of sudden blindness with normal eyegrounds, no improvement followed unilateral operation. In several cases in which it seemed reasonably certain that the ethmoid was at fault, the patient refused operation or passed from observation.

We ask you now to study with us the causes of retrobulbar optic neuritis so that we may learn to recognize with certainty such as are of nasal origin, that you may be able to tell us with certainty that in a given case an intranasal operation is indicated and that in another case nothing is to be gained by such treatment.

Dr. Coffin expressed his appreciation of the amount of work which Dr. Loeb had presented, and was especially pleased on account of the anatomical studies. It was a matter of regret that those of us who have worked so long in this region should know so little of its anatomy. He was not sure that he was fully willing to accept all of Dr. Loeb's clinical deductions, especially the statement that the infection is directly as the distance. You may have an intimate relation as to position between the sinus and nerve, but the method by which the nerve becomes affected is still in doubt. Dr. Loeb did not refer to the possible bulging of the sinus and consequent pressure upon the nerve, but rather to an infection. It must be either through the lymph or venous channels; therefore that part of the sinus nearest to the nerve may be via the lymph or venous channels the farthest away. The frequent association of exophthal-

mos and ptosis with sinus disease in which no necrosis of the orbital walls has occurred, leads him to feel that the trouble in and about the eye is brought about most frequently by some blocking of the venous channels. It had occurred to him that there might be a phlebitis in the ophthalmic veins, of a greater or less severity, not developing an actual thrombosis, to account for the trouble. All the clinical symptoms are present in cases of cavernous thrombosis. He had recently had a case of that kind of great interest, in which he called Dr. Coakley in consultation. They agreed that the case was one of empyema of the frontal and ethmoid sinuses. An excellent X-ray picture was obtained, showing cloudiness over both frontal areas, more pronounced on the side of the bulging eye. The picture, obtained from lateral exposure, seemed to show cloudiness of the sphenoidal sinus. Following operation, the pain ceased, but the eye did not recede, and there developed a very extensive chemosis, which persisted for a considerable time. Dr. LeFevre was called in consultation and pronounced it a case of cavernous thrombosis. The eye symptoms in this case, except as to severity, resemble those frequently seen complicating sinus disease, which conditions incline him to believe that the trouble is due to a blood stasis. He has lately been in the habit of sending suspected sinus cases to the eye department for examination, and the following is a typical report. The patient, a young man about eighteen or nineteen years of age, upon whom a diagnosis of ethmoiditis and sphenoiditis had been made, stated that he had no trouble with his eyes. "Right eye—vision 20; optic disc engorged; especially the descending veins; edema of the left disc less marked; lower veins engorged."

Another very interesting case was that of a doctor whom he saw last spring, upon whom an intranasal operation for frontal sinusitis had been done some years before. There was a swelling about the size of a hazelnut on the forehead over the frontal sinus. Through a skin incision Dr. Coffin was able to pass a silver probe directly through necrotic bone into the frontal sinus. The case showed all the initial signs of optic atrophy.

Dr. Coffin said that the whole question was one of great interest and he was sure that he voiced the sentiment of all those present when he expressed himself as much indebted to Dr. Loeb for his excellent contribution to rhinological work.

Dr. Percy Fridenberg observed that some of the practical applications of Dr. Loeb's paper had been overlooked. A knowledge of

the topography of the accessory orbital cavities, as these sinuses had been called, was often of the greatest importance in the diagnosis of various ocular affections, especially of the optic nerve, and in their operative treatment by extra-nasal, orbital route. Recently, a broad division of the cases had been made into three main groups. First, those in which distention of a sinus with inflammatory or other exudate encroached on the space of the orbit, causing exophthalmos, limitation of motility and at a comparatively late stage, interference with sight. In these conditions, the accessory sinus disease is apparent. In a second type, the inflammation of the sinus extends to the soft tissues of the orbit by lymph or blood channels, or possibly, as in the case of antrum empyema, by metastasis, and causes an orbital cellulitis or abscess, or septic phlebitis of the orbital veins, with frequent involvement of the optic nerve either by extension of the inflammatory process or by compression of the nerve by the exudate. In these cases the accessory sinus disease is generally suspected, and detected without much difficulty. In the third class of cases, there are no orbital symptoms and no inflammatory reaction, at all. The symptoms are the subjective ones, of a loss of a small part of the central visual field, near the point of fixation; the central scotoma to which Dr. Holden had referred. This defect is due to loss of function in the macular fibres of the nerve which supply the point of fixation and area of clearest vision. This is explained by the course of these fibres, from the chiasm in the lower nasal quadrant of the trunk of the nerve. Dr. Loeb's specimens showed very beautifully how distention or inflammation of the spheniod or posterior ethmoid cells would be nearest this aspect of the nerve which would literally be a locus minoris resistentiae. The nerve head in such cases may show very slight changes, if any, in a pallor of the temporal half. Functional examination will show up the scotoma, which is often unsuspected. Vision in the rest of the field may be good. Such cases may be mistaken for retrobulbar neuritis due to alcohol and tobacco, or lead poisoning, syphilis, rheumatism, or a gastro-intestinal auto-intoxication. It may require very careful examination and X-ray pictures to detect sinus disease. Transillumination is of doubtful value except in corroboration. X-rays require perfect technique, and above all, trained interpretation. No doubt there are other obscure affections of the optic neve which may be dependent on accessory sinus disease. We are just beginning to study this subject systematically. There are cases with bitemporal hemianopsia indicating pressure

on the anterior commissure of the optic nerve at the chiasm. The diagnosis of a tumor of the pituitary body is sometimes made, but in a certain number of cases there are no symptoms whatever of involvement of the hypophysis, such as acromegaly, and nervous symptoms. Such cases might be explained by distention of the sphenoidal sinus directly backward. In all the groups mentioned, ocular symptoms are striking, so that the patients are more apt to consult the ophthalmologist than the rhinologist. This accounts for the discrepancy of opinion as to the relative frequency of ocular complications in accessory sinus disease. These cases were recognized and treated operatively by the orbital route by ophthalmologists a number of years ago. The rhinologists can aid us by making a diagnosis of accessory sinus disease, often a very difficult matter, and one which cannot be settled by a simple rhinoscopic examination as was formerly believed. As to treatment, there is no doubt that some cases even of marked blindness have been relieved and cured by simple re-establishment of nasal drainage and local treatment without any operation whatever. In other cases, advanced disease of the mucosa, granulations, pus accumulation, dead bone or polypi have had to be removed by external operation which demonstrated how futile any attempt at endo-nasal probing or application would have been. The orbital route enables us to determine the extent of the diseased area and to remove it thoroughly, and is the only one in cases with exophthalmos or limitation of motility due to distention of the sinus, mucocele, and so on.

Dr. W. W. Carter said that he saw a case last winter that may have some bearing on the subject under discussion, and he desired to ask for information. The oculists tell us that glaucoma is due to a derangement in the intra-ocular interchange of lymph. He had not heard glaucoma mentioned in connection with sinus disease to-night.

Last winter he had a case of pan-sinusitis of fourteen years' standing; the patient is sixty years of age, and has been blind from glaucoma for seven years. He said that polypi had been removed from his nose by a member of this Section fourteen years previously, and he was told by him to return for treatment; he left the city soon after and did not do so. In the meantime he had suffered from a constant discharge of pus from the nose and lately with obstruction.

On examination both nostrils were found to be obstructed by polypi. On removing these a large amount of stinking pus came

from the anterior and posterior ethmoid cells. These cells, together with the antrum and sphenoid, were thoroughly opened up and drained. After considerable treatment the patient, from a rhinological point of view, was cured.

Dr. Carter said that he would like to know from the oculists present if there could be any possible relationship between a sinusitis of this kind and glaucoma.

Dr. Chappell said that he had seen only one case of sphenoidal disease that had any effect on the optic nerve. Such cases usually go to the ophthalmologist first, and the rhinologist rarely sees them unless they are referred to him. The case he referred to was a woman living in the country; she had grippe, attended by nasal discharge, and six months later began to lose her sight and have optic neuritis, which gradually progressed, accompanied by a great deal of frontal and occipital headache. She lost the sight of her left eye, and the occipital headaches continued. She was examined by a competent doctor, who found no pus in the nasal chamber, but the headaches continuing he opened the sphenoidal sinus and found a few drops of pus and granulation tissue. Two or three weeks later the headaches disappeared and remained away on the left side. Six months later she had some loss of vision in the right eye, and she consulted an ophthalmologist in the country. For some time she had posterior occipital headaches, and then came to New York to consult an ophthalmologist, who found beginning optic neuritis. Dr. Chappell saw her at the Manhattan Eye, Ear and Throat Hospital, but found no nasal discharge or pus in the right nostril. Having her previous history, however, he opened the sphenoidal sinus and got 12 to 15 drops of foul-smelling pus and much granulation tissue. Her headaches disappeared in a week, and in a month her eyesight improved, and she recovered the eyesight in the right eye.

We are only beginning to know about these diseases, and the ophthalmologists must recognize the possibility of nasal diseases in eye diseases of this character. The rhinologists and the ophthalmologists should work together, and much may be accomplished in the future.

He expressed his appreciation of Dr. Loeb's courtesy in coming so far and presenting his anatomical specimens before the Section. The facts which had been brought before them were of great value, and might be the means of relieving many cases of blindness in the future.

DR. FREUDENTHAL said that there was much he would like to say in discussing the paper, but on account of the lateness of the hour he would only ask how the skiagraphic picture of the sphenoidal sinus was taken. He had never seen a picture of the sphenoidal sinus that was at all satisfactory, and would very much appreciate any suggestions in the matter.

DR. SKILLERN said that Dr. Pfahler of Philadelphia had given some attention to this matter, and finally conceived the idea of taking it from above the occiput so that it would come down through the nares, and that he would get the large nasal opening as the point of least resistance. In every other direction one encounters either bone tissue or other more or less dense structures, but taking it from the vertex proved very satisfactory. In a number of cases one could see very distinctly a dark shadow where sphenoidal trouble had already been diagnosed. The picture confirmed the diagnosis. The pictures in Dr. De Schweinitz's case were taken from the sides of the head, both right and left, and showed the whole labyrinth in such a manner that one could not distinguish right from left, but a distinct shadow showed that one sinus was affected, and having already diagnosed that the left sinus was affected, the picture was accepted as confirmatory. Dr. Pfahler's method, however, was the most satisfactory.

DR. LOEB, in closing the discussion, said there seemed to be some misapprehension in regard to the character of his paper. It was not presented as a paper on the pathology of sinus disease. Onodi had tabulated all the cases in which an autopsy was held and had found the protocols insufficient in all but two. One would therefore not expect any conclusion as to pathology from a study of material from the dissecting room. From his anatomic studies he had made a few deductions, based on the anatomic relations and the fact that whether the infection is lymphogenous, or hematogenous and by contact, or both, the nearer the focus the greater the likelihood of infection. This would answer many of the remarks that were made; he had not made any attempt to explain the method of infection.

The relation between the nasal opening of the sphenoid cavity and the optic nerve, as demonstrated, signifies that when the sphenoid contains pus there is more danger in some cases than others by reason of the fact that the pus may be much closer to the optic nerve than under other circumstances. In those cases where the opening is high up and near the level of the optic nerve, a thin layer of bone only will lie between the stagnant pus and the optic nerve. Under

such circumstances a skiagraph of the sphenoid with a probe introduced into its nasal orifice may point out the danger. The skiagraphs as now made are of great service, and it will doubtless be possible to do much in the direction of establishing a differentiation of the sinuses and of determining the distance intervening between the sphenoid orifice and the optic nerve intra vitam.

Dr. Skillern did not seem to think it made much difference how far away the optic nerve is from the opening. He also spoke of the thickness or the thinness of the walls. If the specimens are carefully observed, it will be seen that the thickness of the walls varies in individual instances, depending on where the observation is made.

Dr. Holden referred to Berger's conclusions in reference to the ethmoid, which was one of the points that Onodi discussed. His conclusion that the ethmoid disease was not likely to result in infection of the optic nerve, but of the periorbita, is well borne out by the specimens which show that the relation of the ethmoid to the optic nerve direct is insignificant.

Considering that ordinarily this relation is so slight and that drainage through the nasal orifice is generally so likely to occur, it is easy to understand how infection from the ethmoid to the optic nerve is uncommon in spite of the frequency of ethmoidal inflammation. However, in two instances out of the thirty, where the ethmoid replaces the sphenoid, the picture is changed. Under the circumstances, the nerve runs along the external wall, and then the relation is such that it is closer to the mass of pus than under other circumstances and the possibility of infection therefore greater. That was specially significant in this study.

Dr. Coffin had objected to Dr. Loeb's claim that the smaller the distance from the focus the greater the possibility of infection, but this has been well recognized by pathologists.

In reply to Dr. Freudenthal, he could only say that the method of infection was not a subject of this study.

He could not answer Dr. Carter's question about the relation between glaucoma and sinus disease, as he was not an oculist and knew nothing about it.

Dr. Chappell was correct in saying that we are only beginning to learn about these conditions, and the more we study them from the cranial, anatomic, and pathologic standpoint—however extreme the difficulties—the better for humanity, and for the science of medicine.

CHICAGO LARYNGOLOGICAL AND OTOLOGICAL SOCIETY AND CHICAGO OPHTHALMOLOGICAL SOCIETY.

Joint Meeting, November 8, 1908.

A. H. ANDREWS, M. D., Presiding.

SYMPOSIUM ON THE RELATION OF SINUS DISEASE TO DISEASES OF THE EYE.

Dr. Norval H. Pierce read a paper in which he reviewed briefly the anatomical points in connection with the nasal accessory sinuses and the orbit, which could account for an extension of the diseases involving these sinuses to the structures in the orbit.

Dr. Frank Brawley read a paper entitled "The Dependence of Intraocular Diseases on Affections of the Nasal Accessory Sinuses."

Dr. Brawley called attention to the anatomical relations existing between the eye and the accessory sinuses, and emphasized the intimate relations between the orbital contents and these sinuses by way of nerves, blood vessels and lymphatics. He reviewed briefly the literature which dealt with the occurrence of intraocular diseases upon the sinus diseases.

Dr. Brawley reported three cases of his own, where he believes he was able to establish the causative relationship between accessory sinus diseases and intraocular disease. The first was a case of corneal ulcer, in which he found that the anterior ethmoid cells were the seat of a mucopurulent inflammation. An opening up of these cells was followed by recovery from the eye trouble. The second was a case of photophobia, inability to use the eyes, which had lasted for three or four years. For a number of weeks the patient had noticed her vision growing less and the pain in the eyeballs more severe. She gave a history of having had grip five years ago, and had been suffering from a greenish nasal discharge since that time. An intranasal operation was undertaken for opening up the naso-frontal passage, followed by cessation of the headaches, and four days after the operation vision in each eye was 20-15. No fundus trouble at any time. The third case was a patient who, for two weeks, had noticed a haze before the eyes, and for about the same time had severe frontal headaches and eye pains. The left fundus showed papillitis with edema of the neighboring retina. The anterior ethmoid cells were opened and found filled with green

clotted pus. The patient complained that at times the vision was still somewhat cloudy. The antrum was explored, and thick tenacious secretion washed out. The fundus condition improved promptly after the operation, all edema disappearing.

Dr. H. Gradle considered it well-established that a moderate number of eye affections owe their origin to diseases of the nasal sinus. The most frequent instances are those in which there are only symptoms referred to the eye, but without actual lesion of the eyeball. Disease of the tear passages is of nasal origin in more than nine-tenths of all cases, and Birch-Hirschfeld found that at least sixty per cent of all orbital inflammations are extensions of nasal sinus disease. Inflammation of the optic nerve, either retrobulbar or extending into the papilla, has been started by disease of the posterior ethmoid cells or the sphenoid sinus, although these instances are very rare. Whether the sinus disease can lead directly to a lesion within the eyeball is at present undecided. The author has seen four cases of choroidal disease with more or less secondary involvement of the retina associated with sinus suppuration on the same side. In one of the cases the prompt improvement in the eye disease after draining the maxillary antrum made the etiologic relationship practically certain. In another case the connection was made very probable by the recurrence of an isolated choroidal patch after an exacerbation of sphenoid purulency, as well as by the distinctly injurious effect on the eye accidentally exerted by an obstructing tampon. In the remaining two cases the intraocular disease was of the self-limited type, and the pathogenic influence of the suppurating sinus could not be proved though strongly suggested by the histories and the similarities with the other two cases.

DISCUSSION.

Dr. William L. Ballenger: My most striking cases of ocular diseases due to nasal affections have come to me through Dr. Suker, who will report the cases.

Dr. William H. Wilder: I was very glad to observe that Dr. Gradle mentioned that there is merely an association between eye diseases and accessory sinus affections, because it seems to me that sometimes the relationship is rather remote. It is not so difficult to demonstrate an etiologic relationship between nasal and ocular affections, but I think it is much more difficult to determine that the cause of an ocular affection is in the accessory sinuses. It is true that in some cases the relationship is a closer one than in others,

and we can understand how there may bé a connection between sinus diseases and retrobulbar neuritis, for instance, although I have never seen a case where I could say positively that it was caused by disease in the sphenoidal cells, or in the posterior ethmoidal cells. Yet such a condition may exist, and a keratitis, for instance, may be due to disease in some sinus. However, there may be coincidences, and we must beware of jumping at conclusions. I think you will agree with me that no matter how careful an observer one may be, and no matter how large his clinical experience, he will find it difficult to say definitely that a certain disease of the eye in a given case is due to sinus disease.

We frequently have infection in the nose, and it is easy to understand how it may be carried to the eye either by way of the lachrymal apparatus or by means of the fingers, and we are all familiar with such cases. But direct infection from the accessory cavities is more difficult, and after the last word has been said in regard to sinus infection as a cause of eye diseases, we shall probably find that it is chiefly a toxic affair, the result of toxins acting upon the delicate structures of the eyeball.

I agree with Dr. Brawley, however, in this, that it is wise, in all cases where the etiology is not quite clear, to make a careful examination of the nose and its accessory cavities.

In this connection I wish to present a case which has some bearing on the subject under discussion. It is a case of acromegaly, in a man thirty-six years of age; he began to grow ten years ago, having been in good health up to that time. He increased in height from five feet eight inches, to six feet two inches. He now stoops considerably, owing to a kyphosis. He has all the signs of the disease. The skiagraph distinctly shows an enlargement of the sella turcica, the pituitary body and of the frontal sinuses.

Of 175 cases of acromegaly described by Hirtl, 52 per cent showed eye symptoms. This man has pressure on the optic chiasm, and the result is an optic atrophy.

Dr. C. M. Robertson: There are two divisions of diseases which may affect the eye through the medium of the accessory sinuses of the nose. The *first* is traumatism. If one of the sinuses is traumatized, especially the ethmoidal sinuses, an infection may follow involving the orbit or the globe. Several years ago I saw a patient who, while splitting wood, sustained an injury of the orbit just inside the globe from a flying splinter. A physician removed quite a large splinter of wood, and the patient apparently recovered.

Thirteen years afterward the patient came to me with an eye fully exophthalmosed, with no symptoms, except that the eye was pushed down and out. I found a small sinus leading down into the orbit at about the place where the splinter entered. The patient had forgotten the accident. A muco-purulent discharge came from the nose, originating in the middle meatus. On probing the latter, I found rough bone, and an increased flow of pus followed manipulation. I cleaned out the meatus, and with a syringe forced fluid through it into the ethmoidal cells, with the result that the eye popped out much further than it did before the operation. I cleaned out the ethmoidal cells and found that I could pass a probe directly into the orbit, over and under the optic nerve, feeling the nerve with the probe, and around the eye to the external wall of the orbit.

Although this man had had a discharge from the ethmoidal cells for thirteen years, there was no disease of the eye, which as to acuity of vision was equal to the companion eye. At the time of the operation I removed a large piece of wood one and one-half inch long and three-sixteenths inch wide from the ethmoid cells.

We may have cases of this kind following trauma in which there is an inflammation of both the optic nerve and the globe. In other cases the eye is affected by infection from pus in the nose or accessory sinuses, following some other cause than trauma. It seems to me that most of the cases that we can class as diseases of the eye resulting from sinuitis are diseases in which the ethmoidal cells are in direct contact with the optic nerve, so that any affection of these cells may affect the tissues around them, or by pressure on the optic nerve by bulging sinus walls, causing choked disc, followed by atrophy.

In my experience there are a few cases in which the diseases of the frontal sinus affect the eye. That brings us to the consideration of two kinds of sinuitis, suppurative and non-suppurative, which may cause similar symptoms.

Dr. George F. Suker: I think that this discussion has been well prefaced by Dr. Pierce's concise remarks on the regional anatomy of the sinuses. In addition to these remarks, I would say that a consideration of the conformation of the head and its relation to the various sinuses, as well as the relations of the latter to the optic nerve because of this varying cranial conformation, is of exceeding importance.

As the direct implication of the optic nerve by any sinus involvement, particularly sphenoid and ethmoid, depends largely upon the

matter of continuity and contiguity of tissue, one would expect that there would be less ocular trouble in broad and long heads than in narrow and short ones. The size of the sphenoid and ethmoid cells does not vary much in proportion to the relative size of the head. The broader the head, the more usual is a great interocular distance, and hence a less liability of the optic nerve coming in close contact with the posterior ethmoidal cells.

If a brain tumor can cause lesions in the fundus oculi, such as simulate albuminuric retinitis on the one hand and actually produce neuritis and choked disc on the other, irrespective of the specific location of the tumor, it is not at all unreasonable to suppose or to actually attribute the same to sinus involvement. No doubt some of the intraocular lesions may be coincidental manifestations; but certainly many are not, rather, emphatically demonstrating the relationship of cause and effect. Particularly is this so when therapeutic measures, other than those purposely directed to the sinus, yield no results, yet instantaneous ocular improvement following the operative procedures on the sinus for whatever condition may be present. There are a sufficient number of authentic cases on record to-day to prove conclusively the interdependence at times of certain intraocular lesions and accessory nasal sinus disease from a clinical standpoint. Yet the exact manner in which the materies morbi within the sinus reaches the globe is still an open question. Personally, I take it to be a local toxin absorption by some direct route, either vascular or lymphatic. The vascular and lymphatic connection between the sphenoid and ethmoid sinus and the orbit and its contents is extremely intimate. In this connection the emissary veins are extremely important.

Not only does distention of the posterior ethmoidal cells, by pressure on the nerve, give rise to neuritis or choked disc, but the passage of toxic material from the sinus directly into the vaginal spaces of the nerve may give rise to the same intraocular complications as are prone to follow brain abscess or brain tumor. It would be folly to maintain that with every sphenoid or ethmoid involvement one is to expect ocular complications. But, given the peculiar anatomic relationship detailed by Dr. Pierce, with a suppurative process in the sinus, one can reasonably look upon many of the intraocular complications as a direct consequence thereof; and particularly is this true when an immediate improvement ensues after the eradication of the sinus disease.

Dr. Ballenger spoke of cases we have had. I will cite only two of these in brief. A man, 32 years old, contracted an influenzal cold —"stuffy head"—with no systemic symptoms. This nasal condition had been existing for some time. He awoke one morning practically blind. Upon examination of the fundi I found the typic picture of a choked disc with hemorrhages in the right eye; in the left there was a moderate choked disc with a nerve considerably atrophied and several retinal hemorrhages. Personal and family history absolutely negative in every detail. A thorough examination failed to reveal any etiologic factor other than this nasal condition. Dr. Ballenger found an extensive bilateral empyema of the sphenoidal and ethmoidal cells. He operated, and in a very radical manner, first on the right side, and a week later on the left side. Within forty-eight hours after the first operation there was a remarkable improvement in his sight; and one week after the second operation the right eye had cleared so much as to practically give him normal vision. The left eye did not improve correspondingly because of the condition of atrophy. In this case, sinus trouble first involved the left optic nerve and then the right—the latter very suddenly, while in the left eye it evidently produced a neuritis with a subsequent atrophy. He received no other treatment than this, and his right eye to-day has normal vision (with glasses, being moderately myopic).

The other case is that of a middle-aged woman frequently suffering from the characteristic "stuffy head." Each attack was accompanied by extensive conjunctival edema of the right eye, associated with a certain amount of conjunctivitis. This eye condition lasted as long as the stuffy head, usually several weeks. No cause other than the nasal condition could be found for the eye lesion. Upon thoroughly eradicating the right ethmoid and sphenoid sinus, the ocular condition disappeared and has never returned since, though she has frequently had cold in her head since.

This is a large field relatively unexplored, and one that we must carefully consider before we draw any definite conclusions.

Dr. George E. Shambaugh states that there is no question about the close anatomical relationship existing between certain nasal accessory sinuses and the orbit, as well as between the optic nerve and certain sinuses. The frontal sinuses through the posterior wall and supraorbital extension, when such exists, the ethmoid cells by supraorbital cells, when these are present, and the thin orbital plate of the ethmoid and the maxillary sinus through its roof, all

come in close relations with the orbit. These walls are often quite thin, and dehiscence occurs, both congenitally and acquired. The sinuses which come into relationship with the optic nerve are the sphenoid sinuses and the posterior ethmoid cells. A direct extension into the orbit of purulent diseases in the sinuses, particularly the ethmoid cells, is well known. The question whether it is possible for an accessory sinus disease to produce intraocular lesions is quite different. That such a relationship is possible, one cannot deny. The fact, however, that we occasionally find intraocular diseases associated with diseases of the nasal accessory sinuses, cannot be accepted as proof that the one is dependent on the other. If we permit ourselves to blame all sorts of obscure intraocular troubles on disease of the nasal sinuses, especially if we include diseases other than purulent sinus disease, we will be in danger of blaming the nasal cavities where no eye condition whatever exists. The relationship which was pointed out years ago as existing between certain middle-ear diseases and naso-pharyngeal trouble, particularly adenoids, has resulted, as we all know, in many people blaming the nose for all sorts of imaginary relations with ear diseases. Many have gone so far as to urge the removal from the nose of any little anatomical variation, such as a spur on the septum, or an atypically large turbinated body, whenever these were found associated with middle-ear trouble. Many operations on the nose have been undertaken with the mistaken idea of a relation existing between the nose and ear. We must be careful lest more serious operations be undertaken on the nasal accessory sinuses for the relief of intraocular trouble where no relationship is present.

That it is possible, anatomically, for diseases of the posterior ethmoid cells and sphenoid sinuses to produce affections of the optic nerve cannot be denied, but that this is a common occurrence seems very improbable. We have in the relations existing between the facial nerve and the tympanum, a condition analogous to the relation existing occasionally between the optic nerve and the posterior ethmoid cells or sphenoid sinuses. The relation of the facial nerve to the cavum tympani is a constant one, whereas the intimate relation of the optic nerve to the ethmoid cells and sphenoid sinuses is not constant. When we take into consideration the fact that inflammatory diseases of the tympanum are much more common than similar affections of these accessory sinuses, we would naturally expect to find the facial nerve more frequently involved than the optic nerve. We all know how extremely rare it is to find any

trouble with the facial nerve, except in cases of cholesteatoma, a condition which scarcely ever involves these nasal sinuses. All of these facts would lead us to expect an involvement of the optic nerve from inflammation of the ethmoid or sphenoid sinuses as an extremely rare occurrence.

DR. THOMAS FAITH: I feel very much like placing myself in the same position with Dr. Wilder. I have been on the lookout for cases of retrobulbar neuritis due to sinus disease for several years, but have not as yet seen a case. I believe, however, that in many cases of infection after cataract operation, the infection is carried from the nose to the eye, the patient having an ozena, or a suppurative sinus disease.

The benefit derived from operations on the ethmoid cells or on the middle turbinal, where eye symptoms are present, is in many instances undoubtedly due to the depletion at the time of operation. I saw this illustrated once in a case of severe irido-cyclitis. The young man received a severe blow on the nose, which was followed by considerable hemorrhage, and a pronounced improvement in his condition.

DR. E. E. SNYDACKER: Recently there appeared in a German ophthalmological journal a very interesting discussion as to how much of a rhinologist an oculist ought to be. Many views for and against were expressed.

To my mind an oculist either must be a rhinologist himself or must always have one at his elbow.

I think it unfortunate that the papers and discussion to-night centered about things comparatively unimportant to the oculist, while the things important to him, those with which he is constantly dealing, have been entirely overlooked. I recently looked over my private records for the past two years and found that in from six to seven per cent of cases that came to me for headaches supposedly ocular in origin, the headache, in reality, was not due to the eyes, but to a sinus trouble. In this percentage of cases I was positively able to demonstrate that sinus involvement was the direct cause of the headaches. I am certain that I overlooked some cases, and there were other doubtful cases where I never could be quite certain as to the cause of the headaches. Taking it all in all, I should not be a bit surprised if in from eight to ten per cent of cases which either come or are sent to the oculist because of headaches, the eyes are not at all to blame, but rather the sinuses. Many cases of headaches come direct to the oculist; it is his business to

determine where the eyes are at fault, and where the sinuses. I have time and again seen cases where oculists have fitted glasses to relieve headaches due to an inflammation of a frontal sinus. A certain routine procedure must be followed by the oculist, or he will entirely overlook the correct diagnosis in a fixed percentage of his cases.

1. Every patient who comes because of a supposed ocular headache should be tested as to tenderness over the frontal sinus, both on its frontal and orbital surface.

2. Every patient should be questioned as to discharge from the nose; a one-sided discharge should especially be viewed with suspicion. In case of discharge from the nose, it is wise to look at the handkerchief. A green or yellow stained handkerchief is suggestive.

3. A one-sided headache is suspicious.

4. A periodic headache, especially one coming on in the morning and getting better toward afternoon, should always cause us to examine the nose.

5. Where a patient hitherto free from headaches, following a cold or attack of influenza, is suddenly subject to severe headaches, a sinus trouble must always be suspected.

6. We should, as a matter of routine, inquire as to recent colds or attacks of influenza.

Often the removal of a polyp or a polypoid mass will completely cure a headache supposed to be ocular. In every doubtful case of headaches a careful anterior and posterior rhinological examination should be made for pus. One doubtful examination is not sufficient; often repeated and repeated examinations must be made to find pus.

Often operative measures are necessary to clear up the diagnosis. Whether the oculist wishes to resect the middle turbinate or make an exploratory puncture of the antrum to clear up a diagnosis is for each individual to determine; but unless he does this or has it done, he will entirely overlook his diagnosis in a fixed proportion of his cases.

DR. JOSEPH C. BECK: I agree with the last two or three speakers. In quite a number of eye cases in my practice there was a direct association with sinus involvement. I have been peculiarly impressed by one point in the treatment of sinus diseases mentioned here to-night. That is, the report of a large number of cases of ocular affections cured by the simple passing of a probe, or by irri-

gation of the sinuses, or treatment of the antrum alone, and I was rather astonished at the good results the gentlemen obtained. Usually, in sinus diseases, there is a combination, more than one sinus is affected, and one would not expect to get any results whatever from such incomplete treatment. I think that the association or connection between these affections of eye and nose is really a much broader one than the discussion so far has brought out.

DR. E. FLETCHER INGALS: Some years ago I saw a young woman who for two years had so suffered with her eyes that she could not read. I found considerable hypertrophic rhinitis, for which I cauterized the inferior turbinated body of one side. I advised her to go to an oculist for treatment of the eyes. She did not go to the oculist, but returned two weeks later on account of the catarrhal trouble, but stated that her eye trouble had completely disappeared. I do not know what the relations were in this case, but presume the eye symptoms were reflex, due to pressure of the turbinated body.

DR. J. E. COLBURN: Dr. Ingals cauterized a nose some years ago, and immediately afterward the patient complained of low vision. He sent the patient to me, and I found the disc blurred and hyperemic. I assured the lady that after a few days the blindness would pass away. It did so within twenty-four hours, the hyperemia having disappeared entirely.

Another case that has made me rather timid about interfering in this class of diseases was one in which a progressive atrophy had taken place. I could find nothing in the history, personal or family, to account for it. Vision was getting exceedingly low. I referred her to a rhinologist, who found frontal sinus disease, operated, and, either *coincidently or otherwise,* the vision rapidly lowered for a few weeks, and never improved beyond what it had been at the time of the first consultation, although the nasal sinus condition improved. The atrophy in this case had been quite extensive.

I have so often seen a strange relationship between nasal and ocular diseases that it has put me on my guard. What the outcome of this movement is going to be can only be told in later years. We must swing with the pendulum. The present swing of the pendulum will give us a better knowledge of these conditions and their relation to ocular diseases.

DR. NORVAL H. PIERCE (closing the discussion on his part): At the Illinois Eye and Ear Infirmary, where doubtful cases are referred from the eye to the ear, nose and throat side, it is very rarely found that there is any connection between the eye symptoms and

nasal disease. It is only with the greatest rarity that we find anything in the nose to account for the patient being referred to our side. There is, of course, a well-defined relationship between inflammatory diseases of the sinuses and the orbit. Neuritis following disease of the posteror ethmoidal cells and of the sphenoidal sinuses is a very well marked condition. The reflex conditions are about the only ones that can enter into doubt, and I believe that it is wise to observe extreme conservatism regarding these cases, in order to prevent much unnecessary surgical work. Headaches caused by sinus trouble produce pain in the eye if the posterior ethmoidal and the sphenoidal cells are involved. Of course, headache may be caused by disease of the frontal and maxillary sinuses. It is dangerous to say that a sinus is diseased, without external symptoms, that is, without pus coming from the region of the sinus. That there is a so-called occult or closed empyema, especially of the ethmoidal cells, no one will doubt, but these cases must be extremely rare, and the diagnosis can only be made on removal of the middle turbinated body and perforation of the ethmoidal labyrinth.

Dr. Henry Gradle (closing the discussion): How frequently association of sinus disease and ocular diseases occurs can only be learned by clinical research in all cases of eye disease, the etiology of which is not clearly established. We are now at the threshold of our studies in this connection. A one-sided headache, photophobia and uncomfortable conditions around the eye, may all result from nasal conditions, but only as symptoms referred to the eye, and not as the expression of changes in the eye. Few cases of actual organic changes in the eye have been recorded in the literature. Of all cases of lachrymal disease, however, more than ninety per cent are due to extension from the nose, and less than ten per cent are due to a descending infection from the conjunctiva. In orbital inflammation the extensive studies of Birch-Hirschfeld have shown that fully sixty per cent of the cases are of nasal origin, possibly more if the nose had been examined thoroughly. Orbital diseases, however, are not common. How many instances does the most industrious colleague see in his private practice during a year? In cases of optic-nerve diseases it has become the fashion to attribute many of these affections to sinus involvement. A few cases have been reported where an operation proved decidedly effective, when the sinus was opened and found diseased, and where operation produced a cure of the eye affection. Such instances are rare, however.

I have not seen a single case of optic-nerve inflammation following sinus disease. The few cases in the literature of intraocular diseases attributed to sinus lesions are generally not above suspicion. The four cases I have mentioned I collected from my own experience, dating back as far as seventeen or eighteen years. In two cases it was a coincidence, in which I cannot say whether or not the sinus disease really caused the eye disease. In one case there was sufficient proof in the fact that the disease began to recede at once as soon as drainage was established, previous treatment having been without avail. Personally I declare myself very much in favor of the comparative rarity of sinus affections as causes of extra- or intra-ocular disease, but such cases do occur, and it is the duty of the oculist to examine the nose in every doubtful instance, keeping in mind the possible connection between the eye and the accessory sinuses of the nose.

The Distribution of Scleroma. ISIDORE KORNFELD. *Monatsschr. f. Ohrenheilkunde*, Sept., 1905.

The author reports a typical case of scleroma, with thickening of the external nose and of the upper lip, soft polypoid tumors in the nose, cicatricial contraction of the palate, and thickenings in the larynx. The diagnosis was verified by microscopical examination of the pieces removed from the nose. YANKAUER.

Epilepsy from Disease of the Upper Air Passages. LEO KATZ. *Monatsschrift f. Ohrenheilkunde*, Sept., 1905.

The author reports two cases in which epilepsy was cured after the removal of adenoids, and one case in which the attacks ceased after opening both antra, in a case of polypoid degeneration in the mucous membrane of both antra. YANKAUER.